AUGUST 1, 1960
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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

Vol. 64 #15

MODERN CABLE CONSTRUCTION, by John S. Reed

Subscriber-Owned Equipment, by Allan R. Stacey

NOT ACCORDING TO SPEC, by L. A. Gritten

A Job For A Diplomatic Idealist, by D. A. Perigo

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In 1945, Bill returned to the states and decided to further his education. He entered Long Beach City College as an advertising major, and was elected president of his freshman, sophomore and junior classes.

It was in 1949 that Bill joined the General Telephone Directory Company as a sales representative in our Long Beach Division. In 1955 he was promoted to Sales Supervisor.

Bill makes his home in Long Beach with his wife and three children. Over the years he has devoted his time and talents to the Community Chest and the Toastmasters Club.

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industry magazine

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THE TE&M FRONT COVER

USITA's Engineering Committee, and members of other committees, met with A.T.&T. personnel on June 14 to confer on engineering problems. Seated (l. to r.): R. K. GHORMLEY, Lincoln, Neb., Engineering Committee; R. J. LOVELAND, San Francisco, Engineering Committee; A. W. PYRKE, New York City, Subcommittee on All Number Calling; W. A. STEVENS, A. T. & T. Co.; A. A. WILSON, Mattoon, Ill., Engineering Committee; K. L. LAWSON, Lincoln, Nebr., Subcommittee on All Number Calling; FRANK BARNES, JR., Rockhill, S. C., Subcommittee on Transmission & Protection; FRED KAHN, Northlake, Ill., Subcommittee on Direct Distance Dialing; I. B. JACKSON, New York City, Engineering Committee; W. A. PITBLADDO, Rochester, N. Y., Engineering Committee. Standing (l. to r.): A. C. OCKER, H. C. ALTHOUSE, J. ZEHFUSS, JR., Z. E. BARNES, and R. J. BRADY, all of A. T. & T.; W. H. TODD, Bellevue, Ohio, Subcommittee on All Number Calling.

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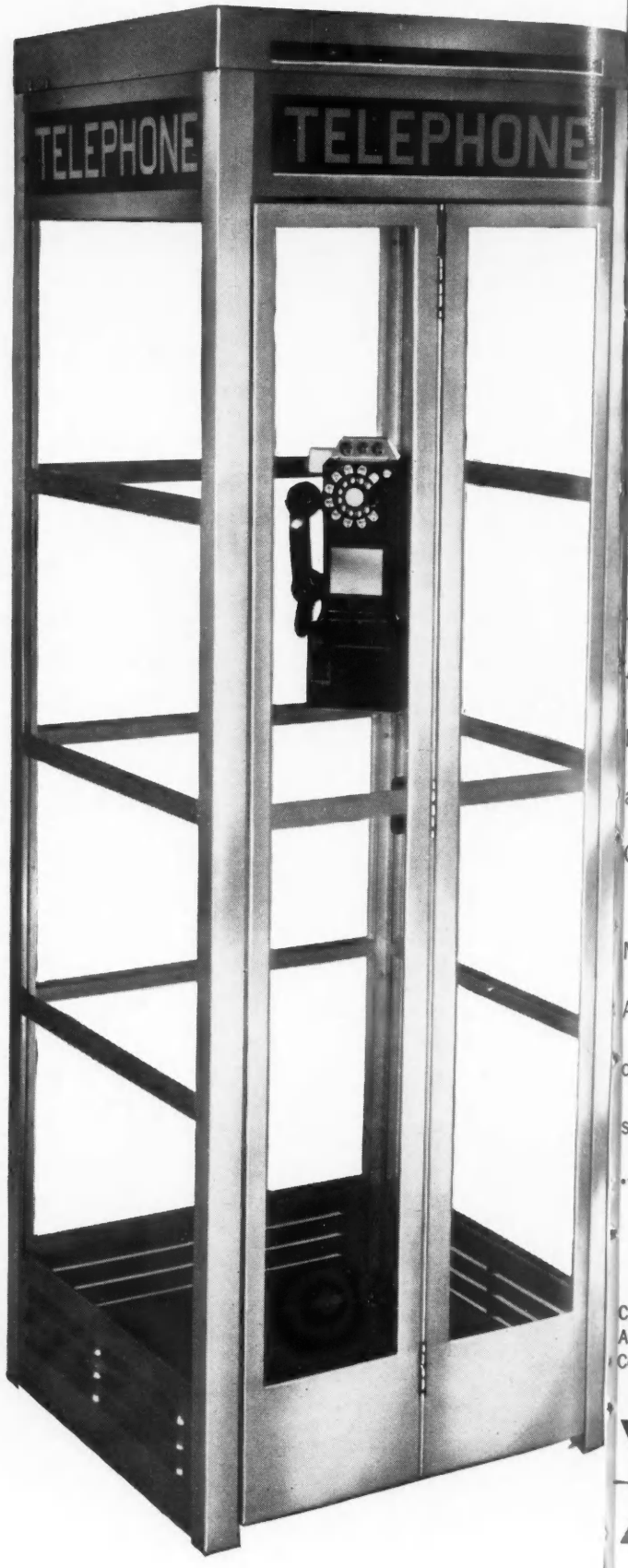

Fits where no booth ever fitted before . . . stacks closer in high-revenue locations!

This new Alcoa® Aluminum "Compact" indoor booth adds revenue by providing convenient service with complete privacy in places no booth ever fitted before. Just 28¾ in. square, it takes 26 per cent less area than its bigger brother . . . saves valuable floor space in supermarkets, drugstores, office buildings, department stores and other busy locations.

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Contact your telephone supply jobber for more information on the new Alcoa "Compact" indoor booth, or write for free folder: Aluminum Company of America, 1721-H Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

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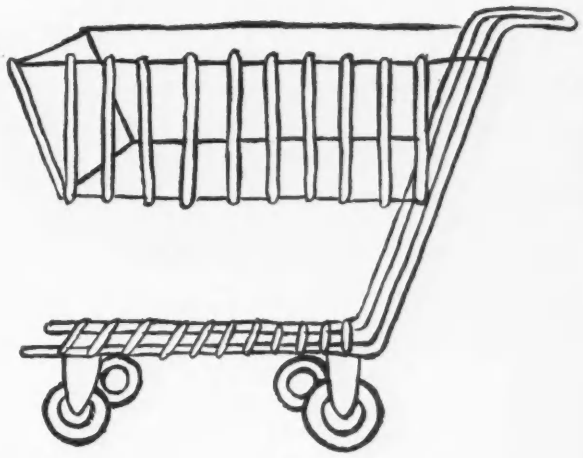
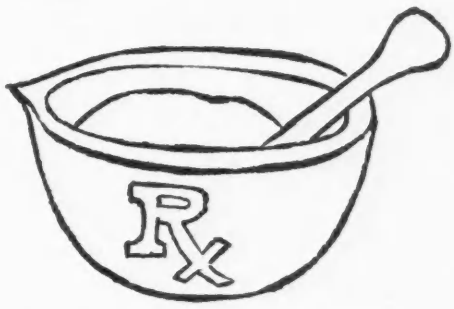
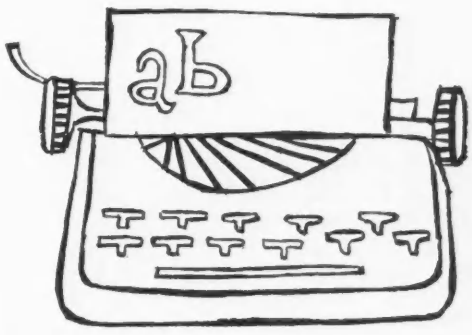


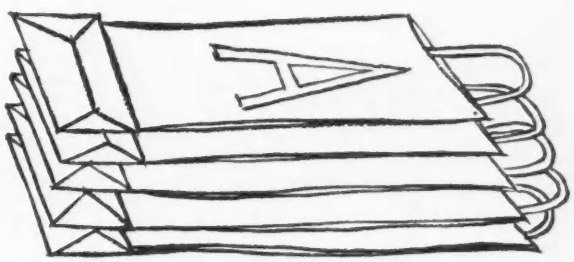
Supermarkets



Drugstores



Office Buildings



Department Stores

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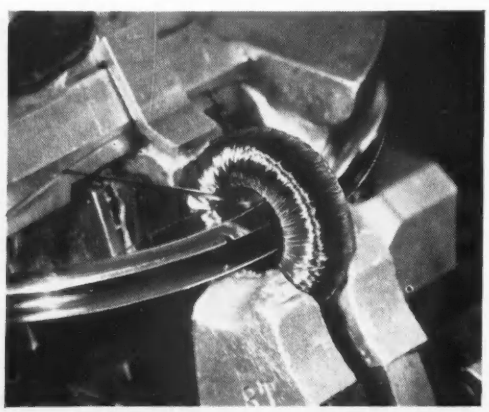

The heart of any frequency-division system lies in its filters, and the success of the filters is highly dependent on the ability of their toroidal chokes and transformers to sharply define a precise frequency spectrum.

Because coils with a sufficiently high degree of uniform tolerance just weren't on the market, Lenkurt has always manufactured its own . . . individually winding each coil to exact electrical specifications. To meet the growing demand for Lenkurt equipment (and the need for toroidal coils), Lenkurt has developed and built unique automatic machinery for toroid fabrication.

Lenkurt coils assure you precise transmission

This "Carousel" produces more than 2100 coils a day. It performs every step in the fabrication, from molding the cores and measuring their individual characteristics to calculating and counting turns of wire . . . compensating for core variations with no chance for human error. It then automatically tests the performance of the finished units. Such automation assures fullest use of frequencies within each channel unit of Lenkurt carrier systems.

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Before you spend a penny for additional circuits, ask your AE representative for more information on Lenkurt carrier for open wire, cable, or microwave. He can help you with system planning, too. Or contact the Director, Carrier & Radio Sales, at Automatic Electric Sales Corporation, Northlake, Illinois.

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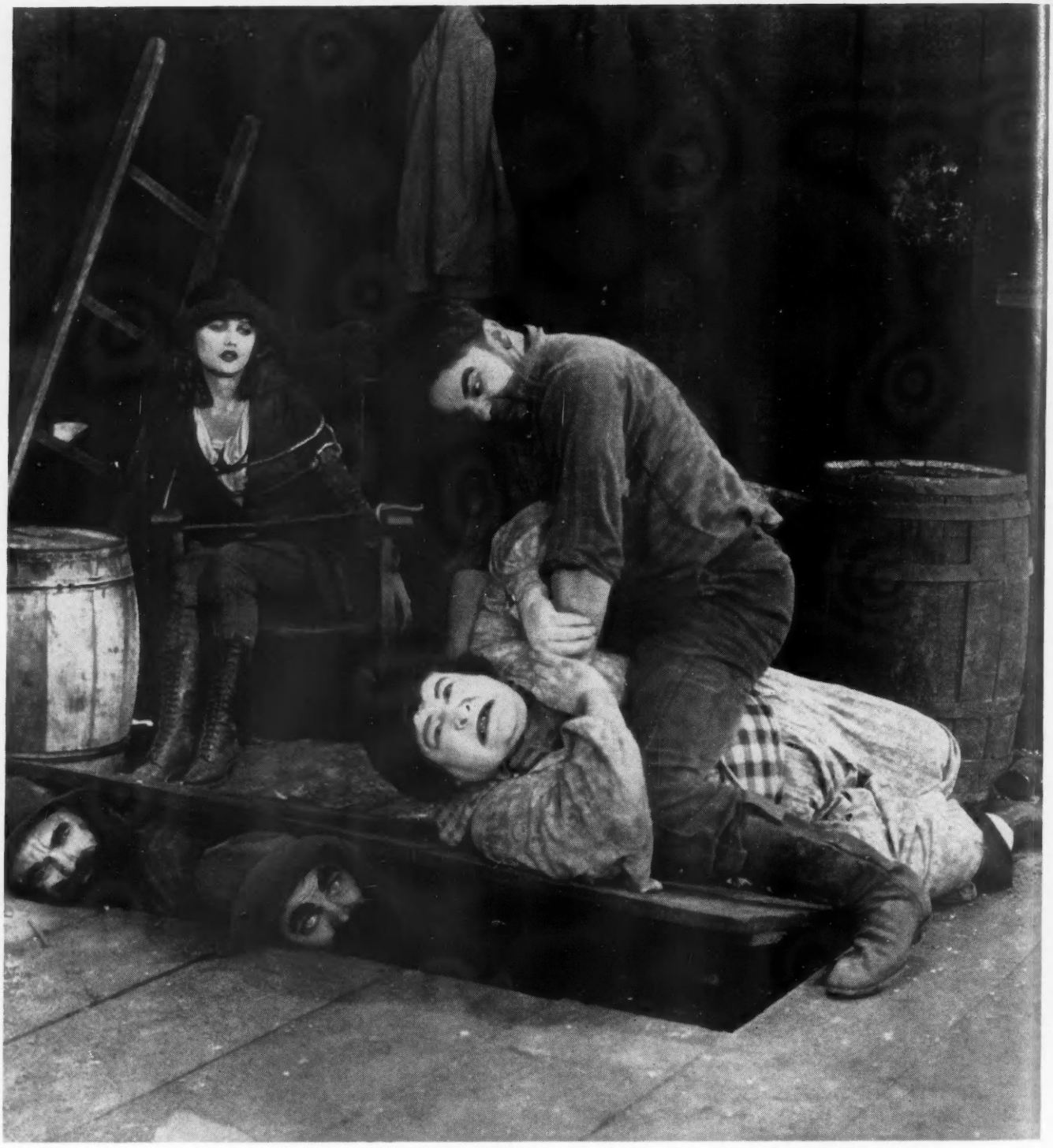

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—WASHINGTON OBSERVATIONS—

By ROLAND DAVIES and FRED HENCK

FCC Hears Space Communications Aspects of 1959 Microwave Decision

As if the nation's telephone industry didn't have enough to occupy itself with on the ground, it now must look to outer space as the great frontier for development of communications services in the next decade or so, it has become clear in a series of filings made with the Federal Communications Commission.

Fourteen statements were submitted by 16 organizations — two of the statements were joint — in the FCC's reconsideration of its 1959 microwave policy decision, which opened the way for broad-scale licensing of privately owned point-to-point microwave radio systems. The reopening of the case is limited by the Commission to space communications considerations, and their effect on microwave frequency allocations, in the area above 890 megacycles.

About 10 witnesses, including four from the Bell System, one from the General Telephone & Electronics Corp., and two from the Electronics Industries Association — which has taken a position of opposition to much of the common carriers' point of view — were slated to appear before the FCC in a one-day session later in July.

Most of the material offered to the FCC in its reopening of the case, however, was submitted in written form, and the relatively brief hearing was intended principally to give the FCC an opportunity to clarify some of the points involved.

50 Active Repeater Satellites Will Provide Means For Worldwide System

American Telephone & Telegraph Co. Assistant Chief Engineer Charles M. Mapes said the Bell System believes a network of "about 50 active repeater satellites in random polar orbits will provide an effective means of providing communication facilities between the United States and all areas of the world."

Looking to the future, he declared that there is an indicated need for "at least 10,000 overseas message circuits, 2000 overseas private line circuits, and two television channels by the year 1980. With today's cable art," he continued, "it would require about 50 telephone cables to provide the telephone and data circuits and we could not provide television." Mr. Mapes added that "requirements up to 1980 justify a minimum of four broadband channels on each satellite," and "even this will not provide a protection circuit."

Looking even further, he declared that "if message growth and telephone development continues (as expected), there would be over 1,500,000,000 telephones and several billion messages would be handled between the United States and overseas points (in the year 2000).

"This would require substantially more than 200,000 circuits or better than an average of 15,000 circuits for each of the 13 main areas served under the network plan . . . Obviously, some routes would have requirements for many more than the average distribution. Furthermore, the television requirements could also be expected to be increased three or fourfold during this period."

"An Extensive Research Program"

Dr. James B. Fisk, president of the Bell Telephone Laboratories, describing in detail some of the current government projects in which the Laboratories is taking a part, said that the organization is "engaged in an extensive program of experimental research aimed at bringing into being a worldwide commercial satellite communication system as early as feasible.

"For such a system, there would be an initial requirement for some 2000

YOU'LL LIKE GENERAL CABLE ALUMINUM BECAUSE

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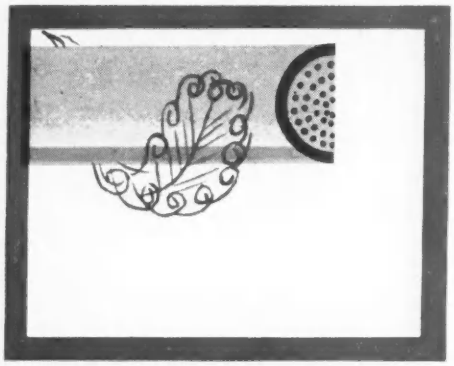
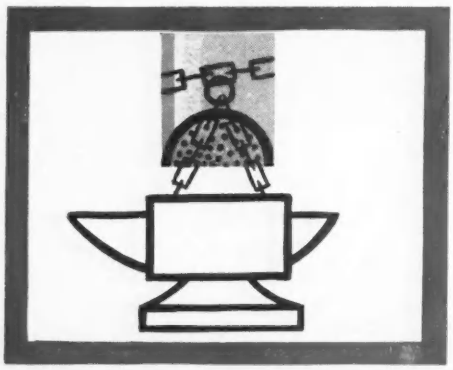


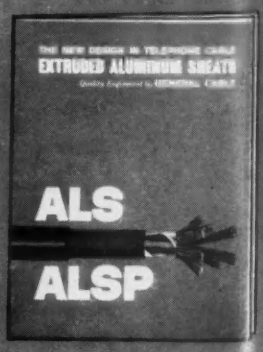
Light-as-a-feather aluminum possesses high tensile strength, permitting less sheath thickness than lead. The result is a much lighter sheath—as light, in fact, as plastic sheath.

ALUMINUM IS STRONG!



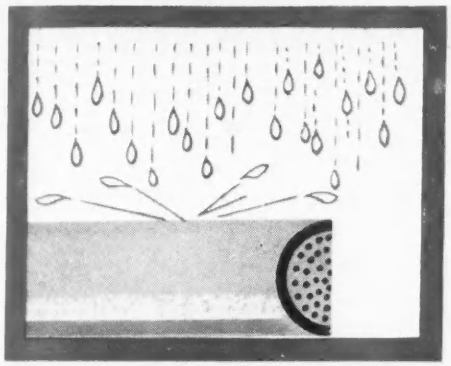
The sheath on aluminum is many times stronger than the sheath on lead or plastic cable. This permits greater pulling stresses, provides better protection from mechanical damage.

FREE! **Aluminum Sheath Catalog—** This brand new catalog includes complete details on General Cable's aluminum sheath cable. Gives full engineering data and color codes. Tells how to handle, install and splice; lists tools necessary for installing. Gives full ordering information. For your free copy, write Automatic Electric Sales Corporation, Northlake, Illinois.



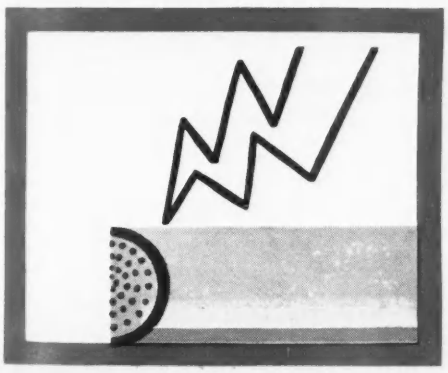
SHEATH

ALUMINUM IS IMPERMEABLE!



Extruded aluminum is seamless. A single tube is fitted tightly over the cable core—moisture cannot seep through! Aluminum sheath protects your cable for more years of service.

ALUMINUM IS HIGHLY CONDUCTIVE!



Aluminum conducts electricity eight times better than lead, Alpeth or Stalpeth. Lower sheath resistance gives better protection from lightning and other electrical disturbances.

Buy General Cable Aluminum Sheath from *AE*—AE supplies extruded aluminum sheath telephone cable in a wide variety of constructions. For direct burial, or installations in seacoast locations or industrial atmospheres, a special polyethylene jacket can be supplied for protection against corrosion. Order from your AE sales representative.

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WASHINGTON OBSERVATIONS

(Continued from page 9)

Space Communications (Continued)

megacycles. The most favorable frequencies lie between 1000 and 10,000 megacycles. Frequencies from 10,000 to perhaps 16,000 megacycles are less favorable but might be used. Natural laws prevent the use of frequencies above 20,000 megacycles for reliable satellite communication . . .

"We firmly believe that it is clearly in the public interest at this time for the Commission to conserve the use of the frequency spectrum and to maintain its earlier sound policy of restricting the licensing of private microwave systems, in order to minimize the coming problems of allocations and interference in meeting frequency needs for space communications."

The organizations filing statements with the Commission outlined a future for space and satellite communications almost too vast to grasp, but the two major entities in the proceeding — AT&T and EIA — divided sharply on the prospects of sharing frequencies between satellite and space communications stations and microwave installations on the ground.

For the Bell System, "important factors" were outlined "which bear on the engineering of radio systems over paths to and from the earth," and it was demonstrated how "these factors limit the frequencies that can be used for communicating between earth and space, and how they limit the sharing of frequency assignments between various users."

In addition, Dr. Fisk declared that "satellite system ground receivers can operate only if they are well beyond the horizon from any microwave transmitters operating on the same frequency. This makes it impractical for satellite systems to share frequencies with ground microwave systems. In satellite communications, a transmitter or receiver terminal could use the same frequencies simultaneously in connection with satellites in different parts of the sky."

On the other hand, EIA contended that "based on the feasibility of cochannel sharing between satellite communications and conventional surface point-to-point systems, it is not necessary for separate allocations to be made for this new use of the spectrum."

Kappel Lectures at U. of California On Satellite Systems

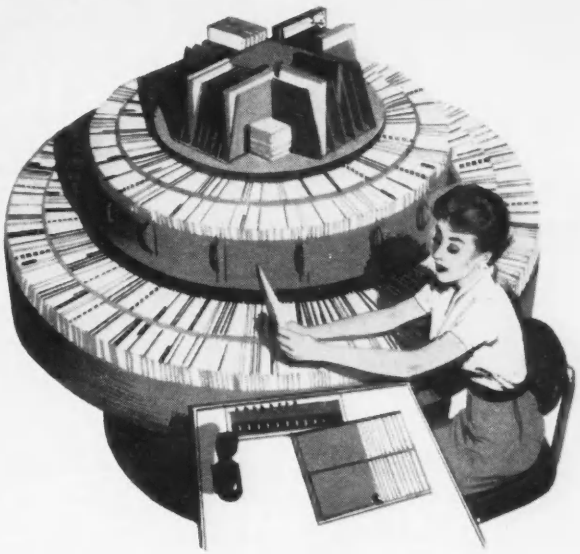
Immediately prior to the filings with the FCC (see above), the Bell System's outlook for space communications from a policy point of view was outlined by AT&T President Frederick R. Kappel in a lecture on "Communications in the Space Age" at the University of California in Los Angeles.

"If we can make (satellite communications systems) work as we believe we can, they will help increase the number of intercontinental voiceways many times over," Mr. Kappel said in discussing the part being played by the telephone industry in efforts to develop such systems.

"We are not exploring the possibilities in order to get a dozen new circuits across an ocean, or even a dozen dozen," he stated. "We start with the idea of getting perhaps 500 to 1000 out of a single system, and hopefully, later on, a great many more than that.

"Moreover, if by using a number of satellites we can span one ocean, then using these satellites plus a few more, we can span others as well . . . "

But the AT&T president cautioned that there are a "few major questions that will have to be resolved in an orderly way." The questions are both domestic and international, he said, and among the "most crucial" is the question of the availability of radio frequencies that will be needed in large quantities for satellite communications.



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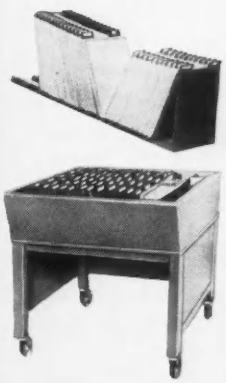

V-ANGLE LINE CARD TRAY. Usable from either end. Flips open at any card, and stays open with supported V-Angle, leaving both hands free. Measured space control keeps space ready for refiling when card is removed or changed.

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We have_____line cards and_____cable and terminal records to handle.

Name_____ Title_____

Company_____

Address_____ City_____ Zone_____ State_____

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

"Der Tag"

AUGUST FIRST is one of the "great dates." Forty-six years ago today a Prussian autocrat, with upturned moustache, a withered arm, an inferiority complex of major dimensions and the finest army in the world, declared war on Russia. Within 100 hours the first World War was raging. An era of comparatively decent and peaceful international relations ended abruptly. Wilhelm II and his military advisers chose to resort to force; and most of the foul turmoil of our world today followed inevitably from their ambitions.

Sales By Plant Men

AT ITS ST. LOUIS convention, the C. W. A. discussed a "Stop Plant Sales" campaign. It adopted a policy in favor of the selling of equipment and services by plant employes "where convenient." But it also declared its opposition to the rating of "selling ability" and bonuses or prizes for selling, where the employe's job is primarily one of installing telephones. "Wage rates, not gold stars, should reflect job responsibilities and accomplishments," decided the meeting.

Undoubtedly there is merit in their reasoning. Many first-rate telephone plant men detest being called upon to act as salesmen, and are naturally unfitted for sales functions. They feel they should not be penalized because they prefer to be technicians first and last.

However, it is unrealistic to suppose that selling by plant employes can be fully successful without such ratings of sales ability and special rewards.

Selling is an art. No two salesmen have precisely the same approach and no two jobs offer the same selling conditions and opportunities. But, like other artists, nearly all salesmen, part-time plant or otherwise, relish overt appreciation. They perform better with it. Ability ratings and special honors are meat and drink to them. No non-seller need ever begrudge them their awards, for everyone gains from every sale.

In the depression of the "thirties", all that saved many a telephone company from bankruptcy, and thousands of telephone workers from unemployment, was the awarding of bonuses for employe sales and merit listings such as C. W. A. now finds so objectionable.

Little Things That Count

DOCTORS NEGLECT their own ailments. Auto mechanics own rattletraps. The man who shines your shoes seldom shines his own. And so on. That is a truism. But of course it could not apply to telephone men. No?

We have been to many telephone conventions for many years. Nearly always there was at least one speech or forum that was robbed of its full effectiveness by a public address system failure. Usually, the turn of a knob or an adjustment of the "mike" was all the trouble; but with hundreds of telephone men present, men familiar with the simple requirements of a P.A. set-up, nothing was done to protect the speakers and the meeting against that injury.

"Man High," by Lt. Col. David G. Simons, U.S.A.F., is a vivid description of several important balloon flights into the dangerous levels above 100,000 feet. In one of these flights, despite elaborate precautions, there was a radio failure and a near-lethal shortage of oxygen.

Someone had reversed two oxygen tubes; and there was a loose screw in a selector channel switch. Captain Joe Kittinger nearly lost his life — and with it the success of the entire series of space balloon projects. His worst enemy was not space, but the inevitable unreliability of homo not-so-sapiens.

That reminds us: If an inspector ever sees our wiring at home, we shall do our writing for TE&M in jail.

"Go West, Young Man"

THE MAY issue of *Exchange* lists 51 U.S. Corporations in the "Billionaire's Club." They are the companies who had sales or revenues of $1 billion or over in 1959. General Motors leads, with $11,233,100,000. Standard Oil Co. (N. J.) follows with $8,522,000,000. American Telephone & Telegraph is third, with $7,393,000,000. General Telephone & Electronics comes 44th, with $1,081,100,000.

The only Bell System operating company in this exclusive club is The Pacific Telephone & Telegraph Co., placed 49th with $1,040,700,000. Apparently Pacific has passed the great New York Telephone Company. In 1958, New York Tel. was ahead, with operating revenues of $949,-139,935 against Pacific's $924,302,615.

This is merely an item of financial evidence of

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33⅓	GB702	GB602
50	GB703	GB603
66⅔	GB704	GB604
SYNCHROMONIC		
16	GB705	GB605
30	GB706	GB606
42	GB707	GB607
54	GB708	GB608
66	GB709	GB609
DECIMONIC		
20	GB710	GB610
30	GB706	GB606
40	GB711	GB611
50	GB703	GB603
60	GB712	GB612

The USI Multi-frequency Ringer is designed to fit any "500" type telephone set that will accommodate a WE Type "C" ringer.

This ringer features a patented mechanical tuning system that is independent of the tapper and gongs.

USI Ringers have lower current requirements. You can reduce interference to adjacent circuits with USI Ringers and use more ringers on a given line.

The extra high impedance of USI Multi-frequency Ringers reduces voice frequency loss.

Check your requirements in the ordering schedule at left and call or write Sales Department today.

USI CORP.

UNITED STATES INSTRUMENT CORPORATION

CHARLOTTESVILLE, VIRGINIA

"OBSERVATIONS"

(Continued from page 14)

what everyone living in God's Country, west of the Rockies, knows without benefit of statistics.

"Westward the course of empire takes its way" — and the America of the future will center its glories on the Pacific Coast.

Blurbicides

BOSS Siragusa, president of Admiral Corporation, warns television dealers that if they fail to keep TV commercials on a high plane, TV viewers will not tolerate them. Three million TV sets now have controls for tuning out offensive commercials, he says; and ten per cent of the sets sold today have remote control devices.

As far as we are concerned, Mr. Siragusa is several years late. Long ago we found that 25 feet of paired wire and a simple switch, cut in series with the loud-speaker, solve the problem very happily.

Horror Upon Horror

LONG AGO, Winston Churchill warned the world of the danger of perverted science. In proof thereof, the scientists split the atom and blew Hiroshima to an even warmer climate. Then came the H-bomb, and in our fatuous silliness we thought we had reached the ultimate in terror.

Vain hope! Dr Paul Aebersold, director of isotope development for the U. S. Atomic Energy Commission, now tells the quivering world that the A.E.C.'s "high intensity radiation development laboratory" at Upton, N. Y. will spend some $250,000 a year developing peaceful (!) applications of atomic energy, including, of all possible horrors, edible sawdust.

Please, Oh Lord, we beg Thee, not in our time. Give us back our nice A-bombs and let it stop there.

They Won't Stop For Us

DAVID J. McDONALD, United Steel Workers president, bemoaned to the C.W.A. convention the displacement by automation of workers in the steel and communications industries. He called for a 4-day, 30-hour week. He will urge the AFL-CIO to carry the fight for 30-hour weeks to the 87th session of Congress.

We gather that Mr. McDonald did not discuss the fact that union insistence upon more and more wages for less and less work, the "annual increase at all costs" philosophy, has greatly hastened the adoption of automatic labor-eliminating devices. Nor did he explain how American industry, tied to a 30-hour week and its consequences, can hope to compete, as it must to survive, with Europeans and Asiatics working harder, for longer hours, and exploiting fully the advantages of automation.

The Ultimate Puzzle

RECENTLY WE mentioned a puzzle perpetrated by Dr. Charles Lutwidge "Alice in Wonderland" Dodgson. ("A" says "B" lies. "B" says "C" lies. "C" says "A" & "B" both lie. Who is lying and who is telling truth?)

The response we have received positively terrifies us. We hasten to close our Puzzle Department forever, or until next time, with the Puzzle to End All Puzzles: If a potentate one filet mignon, and a delegate three pork chops, and a candidate two dozen raw oysters, how much would an athlete, and what would an aesthete?

Wire your answers collect to the chairman of either political party. For the next three months they'll buy anything.

Madison Avenue Blues

AN ANCIENT quip, probably as old as these United States, runs: "He who by his biz would rise, Must either bust or advertise."

One great American concern has given the lie to that. Hershey Chocolate Corporation has been a world leader in its field for many generations, but its success owes little to advertising.

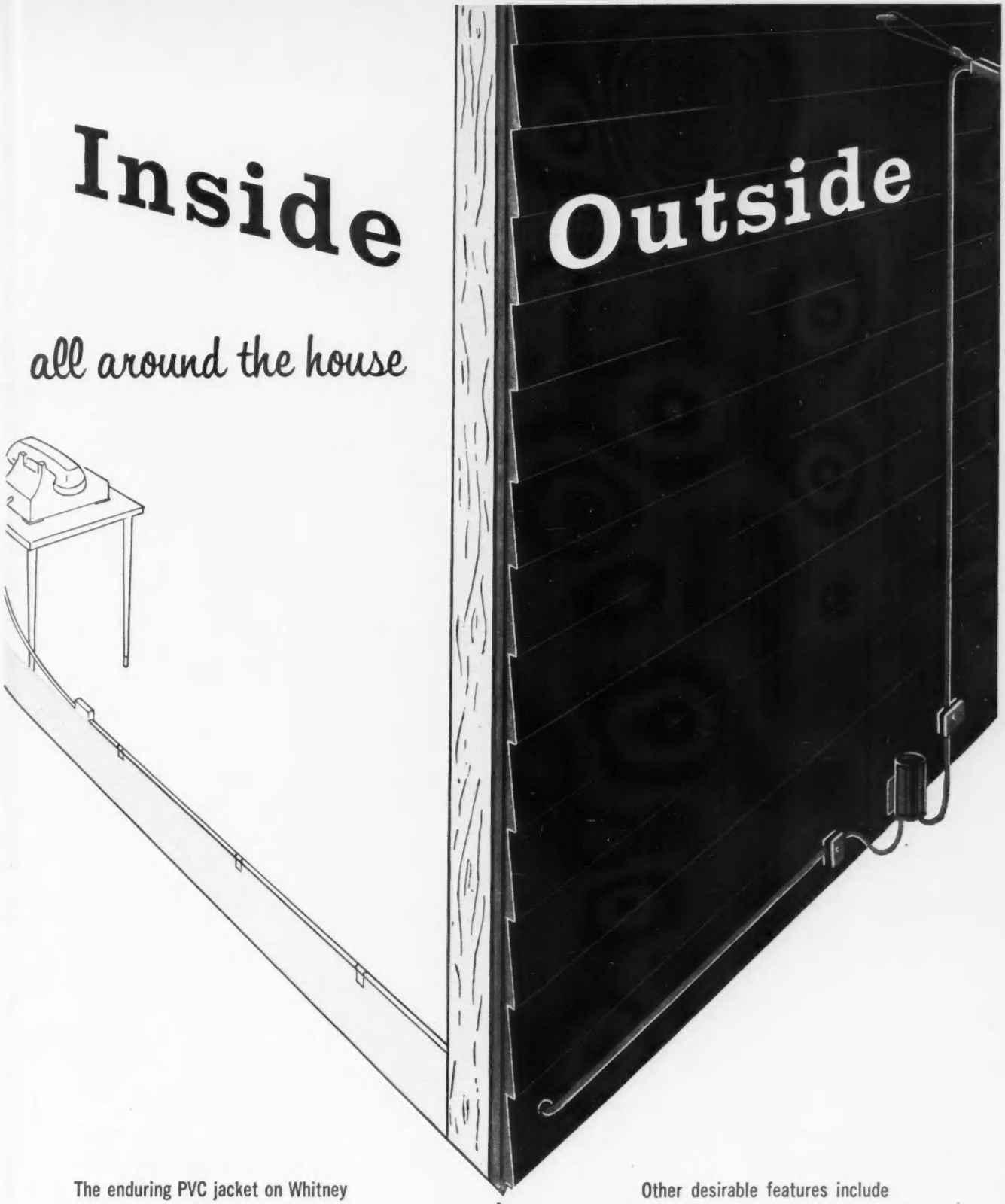
J. E. Council, customer relations manager for Hershey, tells us: "We have never engaged in national advertising as such . . . we are not adversely prejudiced concerning any form of advertising. We recognize the advantages of advertising via radio, television, magazines, etc., but have never had occasion to use those forms in a general way."

What applies to chocolate may not apply to telephone service. For our industry, advertising is doubtless a necessity; but it is also true that with us, as with Hershey, our best advertising is the best possible service. — *Leslie A. Gritten.*

"We're not allowed to build on highway right of way . . . detracts from the scenery, er' sumthin'!"

Inside

all around the house



The enduring PVC jacket on Whitney Blake's new station wire makes it ideal for outside use. Its pleasing beige tone harmonizes with any inside decoration assuring subscriber satisfaction.

Other desirable features include PVC insulation; twisted conductors; convenient knock-out cartons with length clearly marked.

Complies with REA Specification PE-20

WB

Telephone CHestnut 8-5515 TWX NH84

WHITNEY BLAKE COMPANY • NEW HAVEN 14, CONN.

NORTH ERICOFON proven and accepted as the finest telephone in the world

In October, 1956, North introduced the Ericofon to the Telephone Industry. Today, three years later, the Ericofon is offered as a standard telephone instrument by hundreds of telephone companies.

The Ericofon was a proven instrument even before its introduction—proven in laboratory testing over a period of SIXTEEN years of development.

It remained only for the Ericofon to prove itself to YOU—and it has done that.

- The Ericofon has proven itself to be the most beautiful, most wanted telephone instrument in the world!
- The Ericofon has proven itself to be the most convenient telephone instrument to use!
- The Ericofon has proven itself to be the biggest single factor in building revenue increasing extension installations!
- The Ericofon has proven itself to be equal to any instrument in reception and transmission!

If you are not yet offering Ericofons to your subscribers—let the Ericofon PROVE ITSELF TO YOU—NOW. The finest telephone instrument in the world is the Ericofon. Ask any user.

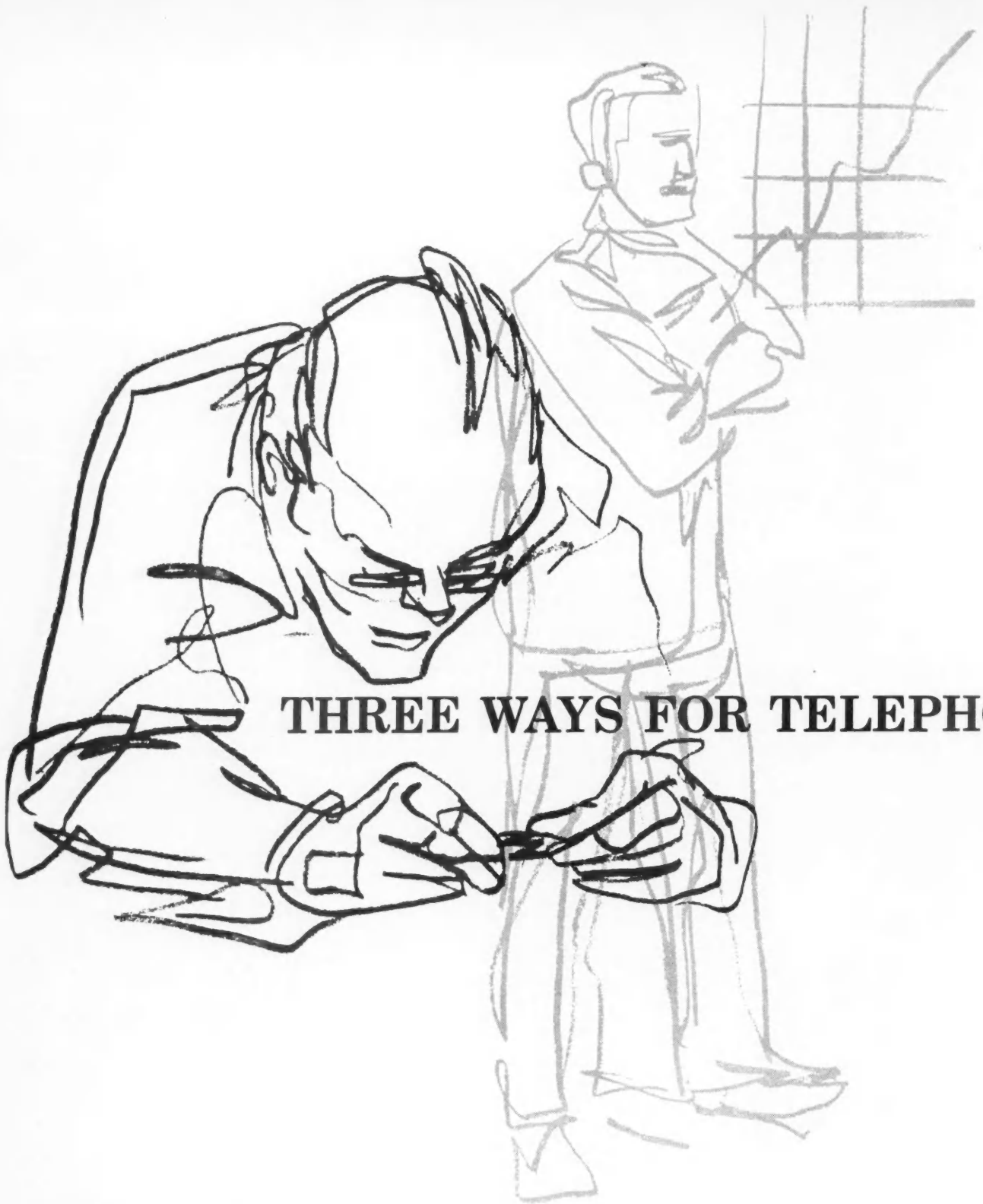
The Ericofon is another product of

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

60-T-1



THREE WAYS FOR TELEPHONOM

LEICH
Subsidiary of
GENERAL TELEPHONE & ELECTRONIC

...OMPANIES TO INCREASE PROFITS

There are three ways for your company to increase its profits.
You can raise rates, you can sell more service to more people . . .
or you can decrease the cost of furnishing service.

The telephone equipment you select is one of the most important
factors in decreasing costs. Consider then, Leich's attitude.

Leich has but one source of income. That's the
Independent telephone industry which we've served for over fifty years.
When we design a piece of telephone apparatus, we design it
so it will work well and long. We design it to eliminate
much of the costly maintenance that can cut into your profits.

In building Leich telephone equipment, we use the best materials.
And we build pridefully and carefully, so our basic,
money-saving design is not lost because of faulty craftsmanship.

Whether you're buying telephones, PBX's, PABX's, dial switching
equipment, line concentrators, or whatever, it will pay you to
get the story on Leich equipment.

EICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS
IFIC COAST: 11401 W. PICO BLVD., LOS ANGELES 64, CAL.
THWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS
EAST: 3651 CONNECTICUT AVENUE, YOUNGSTOWN, OHIO
SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA
anufacturers of telephones, switchboards and related apparatus since 1907

MORE CIRCUITS PER CABLE.
Anaconda High-Count cable contains up to 2727 pairs. More pairs mean maximum utility of existing ducts.

Now get more circuits in new and existing ducts with ANACONDA® High-Count cable

Up to 2727 pairs per cable—that's how Anaconda's HC cable makes possible much more efficient use of your duct banks. In many cases, no new ducts are needed—no new construction to pay for. Your existing duct system can hold more circuits, serve more subscribers and bring in more revenue with Anaconda High-Count cable.

The chart below sums up the basic facts on all types of Anaconda HC cable. For more specific information on any one type, write to Anaconda Wire and Cable Co., 25 Broadway, New York 4, New York. 6024

PHONE THE MAN FROM

ANACONDA®

FOR TELEPHONE CABLE

the independent manufacturer for the independent telephone industry

HIGH-COUNT CABLE

STALPETH

Conductor Size	Number of Pairs	Guaranteed Number of Pairs	Approximate Overall Diameter	Approximate Net Weight	Shipping Weight	Standard Reel Length
			inches	lb per M ft	lb per M ft	feet
19	556	556	2.97	5950	8430	700
22	1111	1111	2.96	5940	8400	700
24	1818	1815	2.96	6060	8530	700
26	2424	2418	2.89	5270	7750	700
26	2727	2721	3.04	5990	8470	700

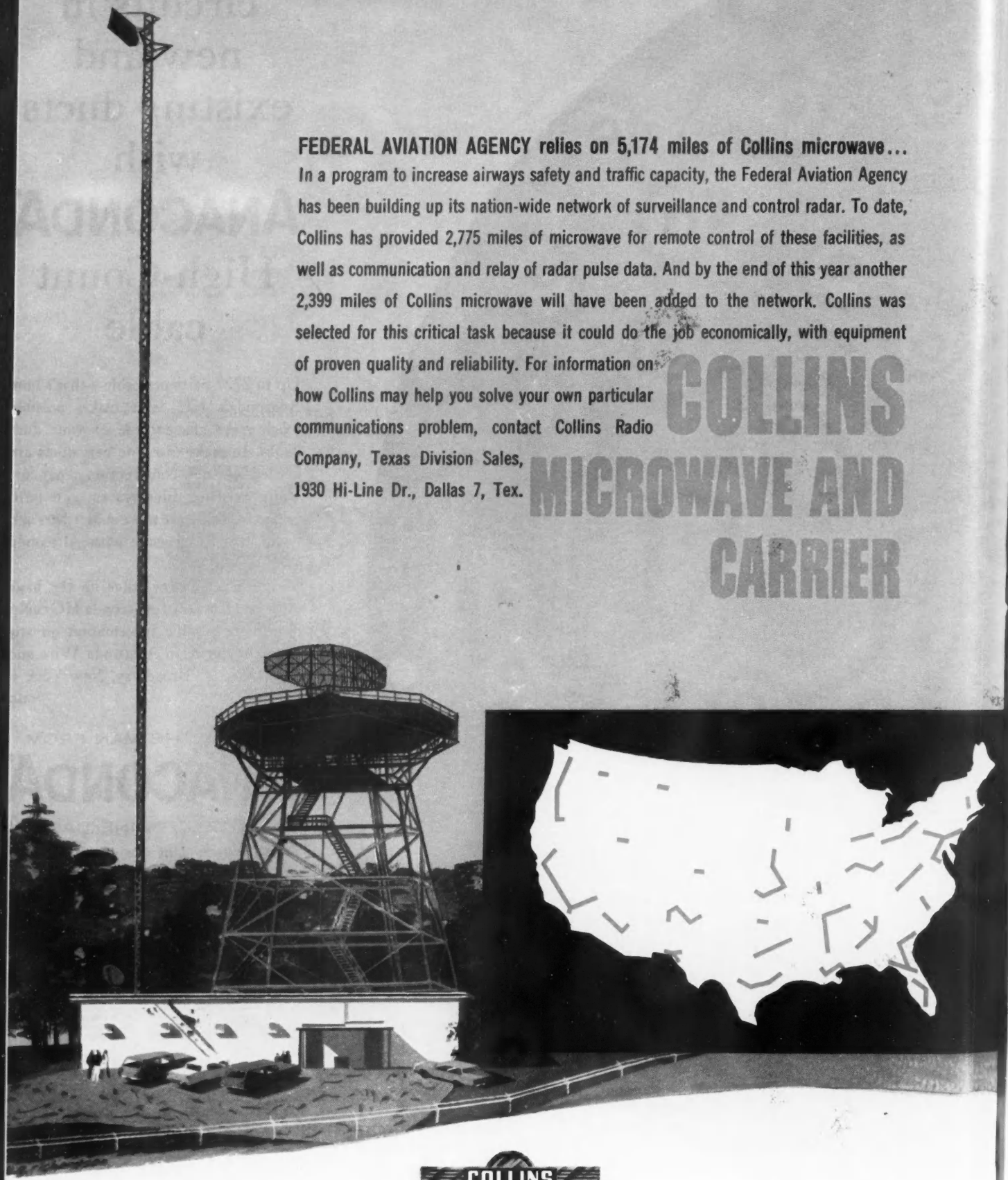
PAPER-LEAD

Conductor Size	Number of Pairs	Guaranteed Number of Pairs	Approximate Overall Diameter	Approximate Net Weight	Shipping Weight	Standard Reel Length
			inches	lb per M ft	lb per M ft	feet
19	556	556	2.86	10,370	12,850	700
22	1111	1111	2.87	10,410	12,900	700
24	1818	1815	2.85	10,320	12,800	700
26	2424	2418	2.78	9,520	12,000	700
26	2727	2721	2.94	10,550	12,920	700

FEDERAL AVIATION AGENCY relies on 5,174 miles of Collins microwave...

In a program to increase airways safety and traffic capacity, the Federal Aviation Agency has been building up its nation-wide network of surveillance and control radar. To date, Collins has provided 2,775 miles of microwave for remote control of these facilities, as well as communication and relay of radar pulse data. And by the end of this year another 2,399 miles of Collins microwave will have been added to the network. Collins was selected for this critical task because it could do the job economically, with equipment of proven quality and reliability. For information on how Collins may help you solve your own particular communications problem, contact Collins Radio Company, Texas Division Sales, 1930 Hi-Line Dr., Dallas 7, Tex.

COLLINS MICROWAVE AND CARRIER



COLLINS

COLLINS RADIO COMPANY • DALLAS, TEXAS • CEDAR RAPIDS, IOWA • BURBANK, CALIFORNIA

These incidents, drawn more or less at random from a half-century of telephone memories, are factual; but in many cases names are omitted or disguised to avoid the possibility of annoyance to those concerned. — (Part Three.)

NOT ACCORDING TO SPEC....

BY L. A. GRITTEN

MY FIRST seven years on this continent seem to have been governed by an obsession that I should not stay in one place long enough to take root. They carried me from London to London, via Winnipeg, Vancouver, San Francisco, New Orleans, New York and way points. My longest stop was about a year; the briefest was a few hours in Juarez, Mexico in 1911, when Villa and the Federals were taking turns to occupy the place; the climate was not healthy for Gringoes.

Then in the spring of 1914 I decided to settle down and went to Penticton, British Columbia as local manager of three little exchanges of the *Okanagan Telephone Company*. It is a lovely little city, at the end of a 100-mile lake lined with orchards, in the heart of a fruit growing country. I enjoyed life, with plenty of work, plenty of play and plenty of friends, in an ideal climate.

In the operating room, the 2-position manual switchboard sat on brand new battleship linoleum. One afternoon I noticed a stain on the floor, right in front of the operators' chairs. Next day the stain was deeper and took in more territory; and each day it grew worse.

I was young, bashful, unacquainted with the operators and utterly lacking the courage to ask them what was wrong. As the stains deepened, so did my distress. Then one day I walked in suddenly and the mystery was explained. One of the girls, her headset still attached, was standing, holding back her skirt with one hand, leaning forward, eating a huge and luscious peach. Juice was running down her chin and onto the linoleum.

It was summer, in a peach country! Often enough, when I drove around on the job, a fruit grower would dump a whole box of the delicious fruit, wrapped, into my buggy — "Something for the girls" — but they always retained the boxes; they were worth three or four cents, cash money.

Then my most enjoyable telephone job ended abruptly. On August 1, 1914 the Germans moved into Belguim — and every eligible man in Penticton moved into uniform. No draft was needed. In those days we utterly despised the idea of conscription. Everyone answered the call before officially speaking there was a call.

More than four years later, just before Christmas, 1918, I was back in Penticton, the first soldier to re-

turn there after the armistice. I called on a friend, *Magistrate Guernsey*. He said: "Will you meet some of the people at the Incola Hotel this afternoon? I'll do some phoning. They will want to talk to you."

Dozens of mothers, fathers, brothers, sisters, wives, widows and sweethearts were there. Soon I was praying that some miracle would remove me elsewhere. "When did you last see John?" . . . Could I say, when a shell blew off both his legs? "Did Henry suffer much?" . . . Could I tell her, yes, he was screaming horribly for two or three hours with most of his face missing, and we were not able to do a thing to help him? And so on. I lied and lied and lied, and got out of there as soon as decency permitted. I didn't go back for many a year. It was a horrible afternoon. That little city contributed splendidly and suffered more than its share in the "war to end all wars."

My next entry into the telephone business was in Seattle, in the winter of 1921. I was one of some 1100 *Western Electric* installers, putting in machine switching, call indicator and other equipment for the big conversion. At that time W.E. pay was low. A complicated bonus system, based on the difference between estimated and actual costs of installation of each job, might eventually bring one's earnings up to something like normal; but there was much dissatisfaction. It was a depression winter, before the big postwar boom set in. There was much acute distress in Seattle; and there was no Social Security in those days. Hold-ups were numerous, even in broad daylight.

One of the gang was late on the job one morning. The foreman tackled him.

"What made you late?" he demanded.

"I was held up on the way here and I reported it to the police," was the reply.

"Is that right? What happened?"

"Oh, the guy stuck a gun at me and wanted money. I told him I was working for W.E. and he gave me 25 cents."

He had actually been held up; but the 25-cent gift was probably his own happy invention. A few days later the same man was called down by the foreman for smoking on the job. He said: "I'm damned if I can afford to stop smoking for 35 cents an hour" — and off he walked.

My chief impression of Western Electric at that time was one of vast admiration for their splendid organization and methods systems. Most of the men on the Seattle job were "hired green." They knew little or nothing about telephone work and had to be taught as they worked. Many of them regarded it as just another job, bread and butter until something better turned up. Yet with those men, and of course a sprinkling of experienced older hands, W.E. installed a new and complex multi-exchange machine switching system and made it work, thanks mainly to excellent administration and methods instructions that provided for everything, down to the most insignificant detail. It was a wonderful system. It had to be!

Easy Money

THE SEATTLE boy's hold-up recalls another one that touched me more nearly. I was switchboardman in a little Canadian city. One of my pals was a "floating lineman" of the type that is rarely found today. He had done about every sort of line work, anywhere from Alaska to Key West, Montreal to San Diego.

Let us call him Jock, as that was not his name. He was a grand fellow in many ways and I liked him. One Saturday evening I heard tales about him. Jock was very drunk and had been thrown out of several bars. To my amazement, he walked into my room about 8 p.m., neatly dressed and quite sober.

I said: "I heard you were soused."

He said: "I'm glad you heard that."

Then he asked me to lend him my Savage automatic pistol. I handed it to him, thinking he wanted to go hunting.

"Any shells for it?" he asked.

"Only what are in the magazine, about six," I said.

"They will do," he said. "Why don't you come along? I might need some help and we'll split 50-50."

"What on earth are you talking about?" I asked.

It seemed that he planned to hold up a gambling joint located about a mile out of town. I had never been there but I knew about the place. It was frequented by some of the "best people" in the little city, including one or two city officials. Jock proposed that I should keep guard outside while he relieved them of their winnings. I was thoroughly alarmed. I tried to talk him out of the idea and demanded the return of my pistol. He laughted at me and walked out.

I sat and worried, half expecting a policeman to come in and arrest me as the owner of a pistol with which someone had been killed. It was less dramatic.

About an hour later, Jock came in, said "Thanks a million," and threw my pistol on the bed.

Feverishly, I broke it. All the shells were there and the barrel was clean.

"Got cold feet?" I jeered. "And am I glad you did!"

"Think so?" he asked — and he started to unload his pockets onto my bed.

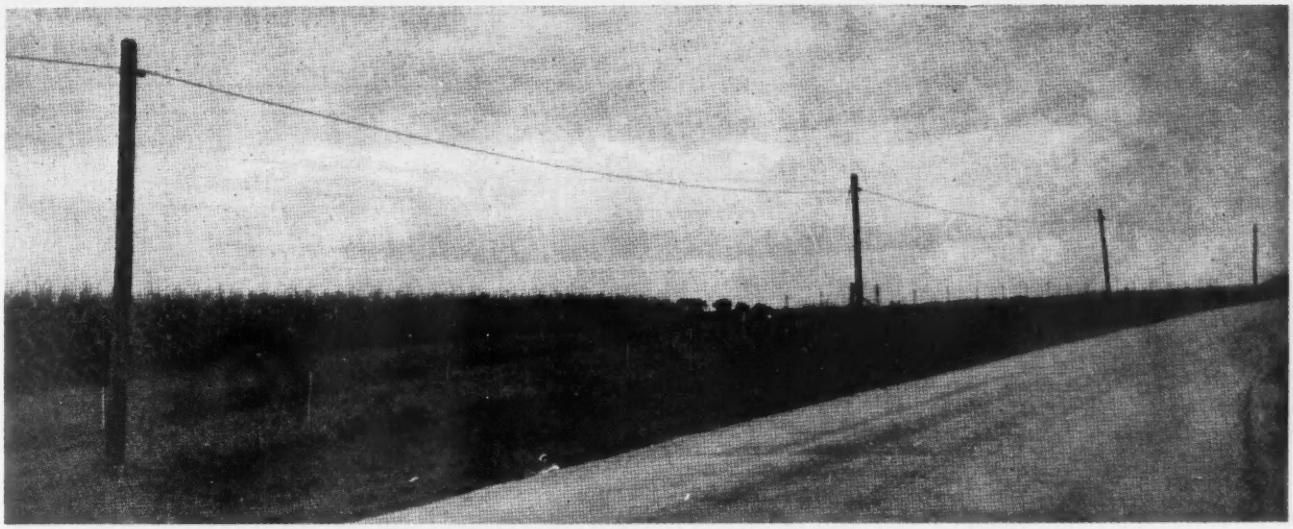
There was something over $1200 in cash, many watches with the massive gold chains that men sported in those days, rings, jewelled stickpins and so forth.

Jock pushed fifty dollars towards me. "That's yours for the loan of the pistol. If you had come along with me, you'd have half of the whole works."

"Take your money and the rest of that stuff and get out of here," I yelled. He went, utterly misunderstanding my dislike of his lawlessness. All he saw in me was a scared youngster, too green to pick up some easy money.

Jock had achieved the Perfect Crime. If anyone had suspected him, half the bartenders in town would have sworn that he was incapably drunk until within a few minutes of the hold-up. The V.I.P.'s who were robbed saw only a well-dressed, coolly sober man wearing a

Please turn to page 43



Plant:—Modern Cable Construction

By JOHN S. REED

CHAPTER XI-C of Mr. Reed's article on cable construction discusses (1) tubular types of conduit; (2) asbestos-cement conduit; (3) fiber conduit; and (4) plastic conduit. Chapter XI-B appeared in the July 1 TE&M.

Tubular Types of Conduit

THE CLAY and concrete conduits previously discussed are preformed multiple or single units of heavy construction with thick walls to provide adequate resistance to crushing. There are other types of conduit which are tubular in cross-section and light in weight and which can be assembled to form multiple ducts. These conduit types are designed to be laid directly in trenches and backfilled or to be encased in concrete.

Light-weight tubular conduit is composed of asbestos-cement, fiber, or plastic and is obtainable in long lengths which can be easily handled in the installation procedure. The conduit material is less brittle and thus is not easily broken in the laying process. After installation, the conduit can be easily rodded for pulling the cable through.

When ducts are to be assembled for encasing in concrete, a thin wall type of conduit is employed, since the concrete encasement greatly strengthens the ducts and enables them to resist crushing under the pressure of earth loads. In fact, many companies prefer to encase tubular conduit lines, partly to satisfy municipal authorities on strength requirements for the underground conduit plant. Nevertheless, durable multiple conduit lines can be and have been successfully built without concrete encasement by employing tubular conduit with thicker walls.

Asbestos-Cement Conduit

THE ASBESTOS-cement conduit described in this series is referred to as "C" telephone duct and "B" telephone duct. The former has thick wall construction for direct burial and the latter, thin-wall for concrete encasement. As the name indicates, this conduit is made of a mixture of cement and asbestos.

In the manufacturing process, high reinforcement strength is obtained by the inclusion of millions of asbestos fibers thoroughly mixed and of random orientation throughout the wet cementitious mass from which the duct is formed. The silky, stone fibers are only a fraction of the diameter of a human hair, but in tensile strength they are nearly comparable to equivalent sections of steel.

This mix is formed and compacted under uniformly constant pressure so that the tensile strength of the resultant cement-bonded product is increased at least sixfold over that of conventional concrete products.

The tube is formed of layers deposited from a uniform, accurately controlled slurry under hydraulic pressure around a highly polished steel mandrel. The curing process following the formation of the tube produces an insoluble calcium silicate bond equivalent to that of concrete exposed for many years to the elements.

The resulting product is strong,

FIGURE 331: — One man easily handles a 10-foot length of "C" telephone duct. Note plastic couplings on conduit ends. (Johns-Manville Corp.)

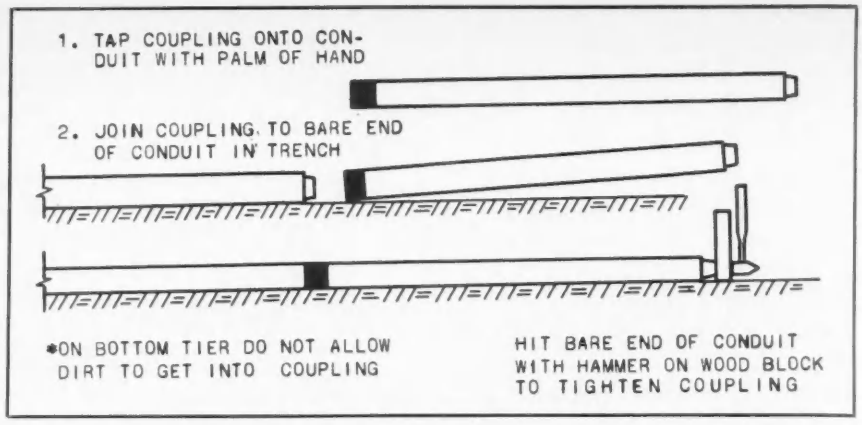

1. TAP COUPLING ONTO CONDUIT WITH PALM OF HAND
2. JOIN COUPLING TO BARE END OF CONDUIT IN TRENCH
*ON BOTTOM TIER DO NOT ALLOW DIRT TO GET INTO COUPLING
HIT BARE END OF CONDUIT WITH HAMMER ON WOOD BLOCK TO TIGHTEN COUPLING

FIGURE 332: — Method of joining conduit with plastic couplings.

light in weight, and comes in long, easily handled section, (*Figure* 331). It is claimed to be immune to deformation, rotting, rusting, fire, fumes, electrolysis and either acids or alkalies occurring naturally in the earth. When used in underground constuction this inert material will last indefinitely and it will not harm cable sheath.

Asbestos-cement conduit has a very low breakage factor, less than one percent when the shipment is properly handled. The conduit has good impact strength and will stand abuse. If it suffers an extremely hard blow before installation it will break clean, instead of cracking, preventing the installation of damaged conduit, which might be overlooked and later fail under soil pressure.

Because of its light weight, a large amount of asbestos- cement conduit can be shipped by truck and easily stored in compact piles at work sites.

Both the "C" and "B" telephone ducts make use of flexible plastic couplings (*Figure* 332) which greatly facilitate the connecting together of the lengths of conduit. The couplings are made of Tenite Butyrate (cellulose acetate butyrate), a thermoplastic that flows at about 300° F. It has the characteristics of toughness, high impact strength, corrosion resistance, and light weight.

The plastic couplings are stated to have more than adequate strength. Hammering of a coupling onto the duct taper, even over and onto the shoulder on the conduit, will not break it. It has adequate shear strength to keep single ducts aligned

FIGURE 333: — Showing how lengths of "C" telephone conduit are assembled in closely packed duct banks for economy of labor.

even when subject to abnormal stresses. In this case, crushing and flexure strengths are not of importance, since when the couplings are assembled on the conduit sections any strain will be borne by the conduit material.

The flexible nature of the plastic provides a very tight joint, tighter than that secured with the other type of coupling used previously, and tight

FIGURE 334: — It is possible to lay "C" telephone duct close behind the trencher to keep amount of open trench to a minimum.

enough to obtain a fairly watertight joint, without the need for cementing the joints. If absolute watertightness is required, use of a joint sealing compound is recommended. This compound will not attack the plastic.

From experience to date, the plastic material is considered to possess an underground long life. It is said to have excellent anti-corrosive properties particularly in acid soils, excellent resistance to concentrations of acid, alkali or salt as found in the most severe soils, good resistance to oil, grease, vegetable oils, soaps and detergents, and water absorption is negligible.

Effect of sunlight on the plastic is negligible. However, if the couplings are to be used in an exposed location, subject to direct sunlight, special couplings containing carbon black should be used.

Though tough and durable, the plastic coupling has a little "give." This property can be employed to advantage in obtaining large angular deflections at the joints (as much as 5 degrees more) and still retain some tightness at the joint. The material is classified as slow burning and supports combustion with difficulty, burning like hard rubber. It has a high minimum distortion temperature of about 150° F, even under abnormal physical stress. The plastic material becomes brittle at low temperatures, and the couplings might split if hit a hard blow when being driven onto the end of the conduit section. Tests indicate that satisfactory installation will be obtained at 20° F. At temperatures below freez-

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"TRAFFIC LIGHTS," by D. A. PERIGO

A Job For A Diplomatic Idealist

Regardless of how it is done, the traffic engineer should look at every job from the viewpoint of the *ideal* way to handle traffic in any particular office speedily and economically. To do his job right he must wear two hats — one labeled "Idealist," and one marked "Diplomat."

WE HAVE already discussed the traffic engineer as a statistician, a mathematician, and a prophet. (See T. E. & M. 7/1/60 and 7/15/60.) Now we want to consider him as an idealist and a diplomat.

It will become obvious — but we will mention it anyway — that while the previous two articles applied to the small company manager (as he wore his different hats) this one applies more to the company which has conventional departmental organization. This, of itself, raises a question which must be discussed in order to understand properly what we mean by idealist.

In some companies the traffic engineer does a complete job of equipment engineering right through to the specifications for the manufacturers. Under such circumstances he sometimes reports to the Traffic Superintendent, while in others to the Chief Engineer.

There are other cases where the traffic engineer is the statistical man and the remaining functions are performed by equipment engineers. In others traffic engineering may be done on a decentralized basis reporting to a District Traffic Superintendent or a District Manager. We don't know what the best arrangement is but we feel reasonably sure that what may be best for one company will not be for another. It is apparent that some Independent companies have organizations that parallel those found in most Bell System companies. This can likewise be good or bad.

We are convinced of one thing each company's top management should study its own organization and develop it to meet its own problems rather than those of some other company. Just to give some examples, here are two companies with about the same number of stations. One company has about 50 exchanges and its own complete toll network. The other has about 20 exchanges and no toll lines — but it is a part of a large metropolitan area with many inter-company trunking problems. Still another company in the same relative station size operates in three states with about 600 air line miles between its most distant exchanges. It operates about 75 exchanges, has its own short haul toll network, and some interstate circuits.

We are convinced that these three companies have problems that differ enough to require different types of organization in other points — but we are now concerned with only the traffic engineering function. Centralized traffic engineering may be all right for the closely integrated companies because the traffic engineer is close to the operations from the standpoint of distance but *is he close enough* when those operations are under four different District Managers?

We believe that traffic engineers should be as close to the actual operations as possible. This makes it possible for him to observe the results of what has been provided — and even though he is an outstanding statistician, mathematician, and prophet — he needs another something called judgment.

Now perhaps we have built a foundation for the idealist! In the very beginning we point out the constant need for a system of checks and balances — for without such a system, our theory of idealism is punctured.

The traffic engineer should look at every job from the viewpoint of the ideal way to handle traffic in any particular office. This can be applied to the office floor plan, the keyshelf arrangement and the face equipment in manual offices.

For example, several years ago when there were no traffic engineers in a certain company, some CDO's were established and in the operator office it was necessary to use cord dialing. The dial cord jacks were installed *below* the toll switch trunk jacks. It seemed like a convenient way for the equipment installer to put them in — but it interfered with service given by operators for many years.

We use this illustration to make the point that a traffic engineer in recommending the ideal would have put the dialing jacks *above* the trunk jacks. He would also recommend that the jacks be high enough from the keyshelf to make it easy for the op-

erator to insert and remove plugs.

When a traffic engineer proposes face equipment, with the toll circuit groups assigned for the ultimate, he is looking at the ideal arrangement because he knows that operators become very familiar with the location of the various groups, and when some rearrangement moves the circuit groups the operators lose precious seconds in finding a circuit.

"The Diplomat"

NOW IS THE time to bring in the second item of this article — because, while the above is ideal from an operating angle, the traffic engineer knows that to provide an ultimate layout on the initial installation would be too costly. Just the same he does it — then works back from that point to the present requirements. This is where he becomes a diplomat in dealing with the equipment engineers because he must convince them that the fewer the relocations the better the service from the operators and the lower the plant labor in making the rearrangements.

If he is the proper kind of diplomat he can prove that someone besides traffic also benefits from having a few extra jacks on the switchboard — and to the extent that the labor savings will offset the additional carrying charges on the equipment.

Let's take a look at a step by step dial office from the ideal view. The ideal arrangement would be to have the equipment set up so there are the right number of switches to give the proper grade of service every hour of the day from the time of installation until the end of the engineering period. Sure, we know it is impossible to do this even for a day, to say nothing of a couple of years. One of the dial service problems is that when a job is engineered it is done on the basis of the delays which will exist in the busy hours when it is time to make an addition. This means that for a period of about two years we have an investment in equipment we don't need — and even at the end of the period we have too much equipment about 21 hours a day.

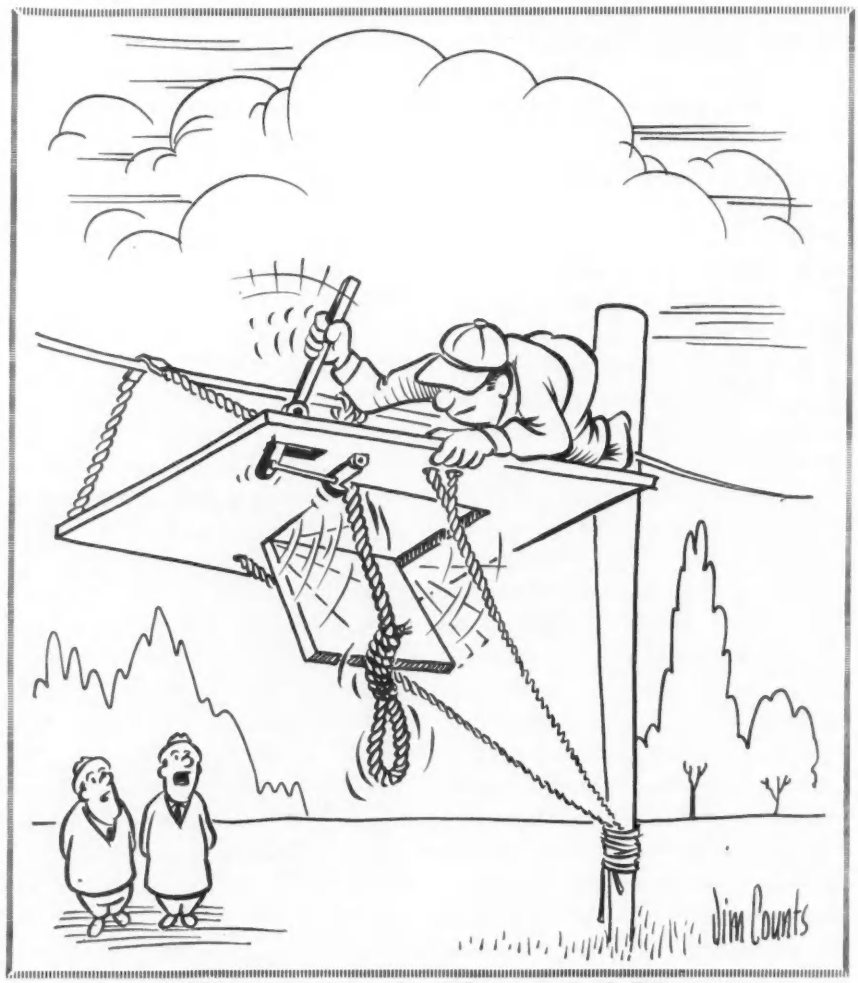
The traffic engineer as an idealist believes in the "even service theory" because he knows when subscribers always receive instantaneous dial tone for a year and a half they will begin to complain when they encounter an occasional brief wait for dial tone. With the "even service theory" the full complement of shelving is installed but not the switches. They are added as the load builds up. Even as an idealist he recognizes this is not possible in a small office since the cost of administration would outweigh any savings in the investment in switches.

As an idealist the traffic engineer expects that the switches which he has engineered are installed and maintained so they are available during the busy hour each day. Also as an idealist he expects that dial office administration will keep the traffic balanced through all the paths of the machine. Through diplomacy he makes sure that all of these things are done by the people responsible for them.

We set out to be non-technical in discussing some things involved in traffic engineering. Sometimes we wonder about the value of a book on this subject, and the more we think about it the more convinced we become that a book would be of little value. Such a book would necessarily be all inclusive and most traffic engineers, or those aspiring to be, don't need all kinds of switchboards, or dial equipment.

Most of all, however, the book would be out of date before it could be published. We think a better idea is for the traffic engineer to learn from the recent experience of others. The manager of the small company can get traffic engineering advice from consultants, larger Independents, and their associated Bell System company.

Regardless of how it is done, the objective must always be kept in mind. Traffic Engineering is done so each subscriber's call can be handled speedily and economically. This means providing equipment in as near perfect amounts as can be reasonably expected. — *D. A. Perigo.*



"He says it keeps his helper on the ball."

"SUB-HARMONICS and OVERTONES"

By C. D. EHINGER

Reader Survey Brings in the Mail

The recent TE&M reader survey brought in letters from nearly every state in the union and several foreign countries requesting articles on subjects ranging from "Human Engineering In Industry" to "VNL Problems."

BACK in the January 1, 1960, issue of *Telephone Engineer and Management*, I wrote an article requesting that you indicate the type of article or, rather, the subjects which you would like to see discussed in this feature. As a part of the article, a check-list was also presented listing some of the types of subjects which I felt some of you might be most interested in having presented. I was, of course, being quite selfish in writing such an article, but the other side of the coin is that I felt that I might as well be beating my brains out on subjects which *you* most wanted rather than something else.

The flood of requests and letters which have come in as a result of this article has been very gratifying but I certainly feel like a "dog" about one part of it. I have answered every letter which has been written to me as a result of *all other* articles but frankly, fellows, I haven't answered a single letter to the "subject interrogation" article. Forgive me for my omission — practically each one of these letters was the type which did not seem to expect an answer.

"Many Interesting Replies!"

THERE were a great many interesting replies; from Fairbanks, Alaska, came a request for articles on "Human Engineering in Industry," and the writer also asked "Has anyone prepared a short course in "How to Waste Human Ability." A letter from Louisville, Ky., commented on the "Much Maligned DB" article and requested additional articles on test instruments.

From Arlington, Va., came a request for articles in connection with developing our rural areas for expansion and upgrading of service. From Tacoma, Wash., came requests for basic test procedures of all types. From San Francisco, Calif., came a request for articles on hybrid test sets, concentrators, and general radio engineering. From Toronto, Ontario, we received a request for methods of testing PAP and PIC cable; from Scranton, Pa., a request for articles on test instruments, radio, and basic engineering. From Chicago, Ill., came a suggestion for articles on prewiring of homes; a Ft. Collins, Colo., reader wants articles on test instruments and wave analyzers; a Toledo, Ohio, reader wants articles on concentrators and basic engineering; and from Anchorage, Alaska, a reader requested items concerning radio and concentrators, basic engineering, and VNL problems.

Most-Requested Subjects

THERE were letters and returns from nearly every state in the union, and a good many foreign countries, and generous use was made of the space which had been allocated for "comments." From all of these suggestions and letters, it is quite easy to see what appeals to you most. In order of preference, subjects most requested were as follows:

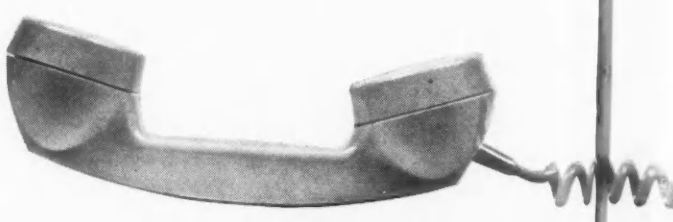
(1) Basic engineering.
(2) Oscilloscopes and their uses.
(3) Basic telephone engineering.
(4) VNL problems.
(5) Concentrators.
(6) Hybrid test sets.
(7) DB meters.
(8) Mobile radio.
(9) Commercial radio operators' license.
(10) Oscillators.
(11) Point-to-point radio.
(12) Basic dc and ac theory.
(13) Lab experiments in dc and ac theory.
(14) Basic radio theory.
(15) Lab experiments in basic radio.
(16) Special announcement equipment.
(17) Distortion analyzers.
(18) Use of carrier and its applications.
(19) Teletype theory.
(20) Transistor theory.
(21) Cross-talk measurements.
(22) Serving sparsely settled areas.
(23) Testboards.
(24) Electronic switching.
(25) TV and microwave.

It would appear, from the above list, that John Reynolds, the editor of this magazine, has been on the right track in selecting the type of subjects which you most want.

An article on a public announcement system appeared in the April 15th issue of TE&M and a series of

1600-W: It's SMART . . . it's SMALL . . . it LIGHTS! The PETITE—newest, most glamorous number. And from your standpoint, most profitable. Perfect extension for any room; main station, too. Comes with new, compact wall-mounted ringer for superimposed, straight-line or harmonic ringing.

nothing newer—nothing finer than the complete line of telephones by Stromberg-Carlson



1573-W: (Above) Use it two ways and reap the profits! It provides two-line service plus intercom, with Hold on each line. Or, with a simple adapter, it's a three-line telephone with Hold on each line, without intercom.

1553-W: (Right) The ideal telephone for many, many applications: in kitchen, den, halls, workrooms—just about anywhere in the home. Great for your business subscribers, too—especially where space is a problem. Its slim, trim design gives it tremendous versatility.

1575-W: (Below) This 6-line telephone, used with the Stromberg-Carlson 6K-1 PBX, is the smallest phone of its kind. Flexibility and versatility are unmatched, with an almost infinite variety of services.

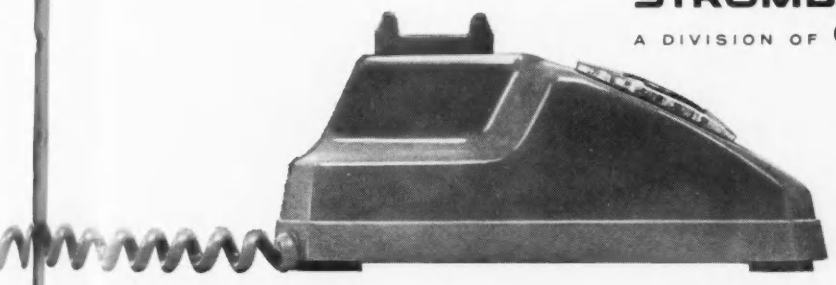
Choose from the most complete line of quality telephones in the independent field! There is nothing newer . . . nothing finer . . . nothing more profitable to you!

Stromberg-Carlson telephones mean satisfied subscribers because of superb transmission and reception quality; graceful styling; full range of smart modern colors.

Contact the Stromberg-Carlson representative in your area. He's the man with the facts, the figures and the selling aids you want.

In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**



1543-W: It's handsome, compact, styled with snap and sparkle. This telephone is engineered for high fidelity of voice transmission, for ruggedness, for true full-range performance. Lightweight handset, of course.

four articles concerning VNL problems and basic engineering of VNL problems started with the June 1st issue of TE&M.

The editors and publishers are also considering a complete series of "Home Study" courses in a variety of subjects applicable to the telephone industry — basic dc and ac theory, basic telephone engineering, basic radio engineering, radio operators' license examination, etc.

Information which they now have available, in addition to the results of my particular interrogation, indicates that such a series would be favorably received by the great majority of you. It is amazing to find out how much on-the-job training is being given by a great number of our telephone companies. Most certainly, no one will argue the point that we have not nearly enough well-trained technicians at the present time and that we will need a great many more in the near future.

That about winds up the results of this survey. To those of you who sent in your requests, comments, and suggestions, I can't thank you enough. I sincerely hope that you will understand why I was unable to answer each one of you. To those of you who may not have answered or sent in the original query and may have thought of something in the meantime, the original check-list is being printed once more for your use. Don't be bashful about filling it out and sending it in! To the great number of you who commented about the "Kid" articles and requested more of them, please be notified that I intend to write many more articles about that happy-go-lucky lame-brain. I do wish that he would spend a little more time on basic arithmetic and mathematics and less time in "trying to make like a Romeo." It would certainly make it a lot easier for Jim, Chet, Bill, and Chuck to pound a little bit of basic knowledge into that thing he calls a brain! — *C. D. Ehinger.*

—73—

Any comments, criticisms, or suggestions for future topics? Address all correspondence to "Sub-Harmonics and Overtones," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Ill.

Night Driving

Here are facts on night driving which every motorist should know:

The accident rate at night is four times greater than the daytime rate, although traffic is only one-half so heavy.

Tinted sunglasses should not be worn for night driving. They rob your eyes of needed light.

If you are going to drive at night, protect your eyes from snow or sun or other glare during the day. Otherwise, you may be temporarily "night blind."

Gluing your eyes on the white road line or the tail lights ahead gets to be hypnotic. It dulls your senses and causes accidents.

If your eyes trouble you when you drive much after dark, consult a vision specialist about glasses specially prescribed for night driving. While you're about it, better get a vision checkup for daylight driving too.

— ***Safety Briefs***

To: "Sub-Harmonics and Overtones," "Telephone Engineer and Management," 7720 Sheridan Rd., Chicago 26, Ill.

I would like future articles on:

Test Instruments: —

- ☐ Oscillators .....
- ☐ DB Meters .....
- ☐ Oscilloscopes .....
- ☐ Hybrid Test Sets .....
- ☐ Others: .....

.....

Radio: —

- ☐ Mobile .....
- ☐ Point to Point .....
- ☐ Amateur .....
- ☐ Series on obtaining Commercial license .....
- ☐ Others: .....

.....

Central Office Equipment: —

- ☐ Concentrators .....
- ☐ Special announcement eqpt. .....
- ☐ Others: .....

.....

"Lab Report" Articles: —
Specific items of Mfgrs. eqpt.

- ☐ .....

.....

.....

Transmission Articles: —

- ☐ Basic Engineering .....
- ☐ VNL problems .....
- ☐ Others: .....

.....

"Home Study" Articles: —

- ☐ Basic d.c. and a.c. theory .....
- ☐ Lab Experiments to supplement d.c. and a.c. study .....
- ☐ Same as above for Radio .....
- ☐ Same as above for Telephone Engineering .....
- ☐ Others: .....

General Articles: —

- ☐ .....
- ☐ .....
- ☐ .....

- ☐ Other comments: .....

.....

.....

.....

- ☐ Frankly, Ehinger, I never read your stuff anyway!

Name: .....
Title: .....
Company .....
Location .....

(Name not necessary)

COMMERCIAL DEPARTMENT NOTES
By ALLAN R. STACEY

"Subscriber-Owned Equipment ? ? ?"

In the June 15 issue, D. A. Perigo, editor of TE&M's "Traffic Lights," raised the question of "*subscriber ownership of station equipment*" and mentioned that other utilities "*end their investment at the subscriber's premises.*" In this issue Mr. Stacey answers Perigo with his claim that "the present method is best."

My Dear Mr. Perigo:

In your "Traffic Lights" column of June 15, 1960 you make the following suggestion:

"Suppose we sold everything that is now in plant accounts 231 and 232 to our present subscribers. How far would that money go toward providing the outside plant to upgrade our customers to one and two-party services?"

How Far Would It Go?

MR. PERIGO, have you computed just how far this money would go? Let's make that computation.

Referring to the 1958 Annual Statistical Volume published by the United States Independent Telephone Association for the year 1957 (the most recent volume I have handy on my reference shelf) we find that all gross additions to plant for the year 1957 were $447,800,000. On the same page (page 19) we see that the total investment of the reporting Independent Telephone Companies in station apparatus was $282,600,000. This latter amount increased $60,000,000 from the total at year end 1956. Subtracting the $60,000,000 from the $447,800,000 gross additions during 1957 we find that additions without purchase of station apparatus totaled $387,800,000 in round figures.

In other words, we spent more in gross additions in one year than we would gain by selling back to the subscribers all of the station apparatus in all of the reporting Independent Companies, assuming that we could negotiate a cash sale situation. Continuing to assume that we could negotiate a cash sale for the $282,600,000, how many working days of total construction budget would this last? The result, Mr. Perigo, is that it would last 190 working days. I think the answer is that money obtained from selling everything now in plant accounts 231 to 232 would be very foolishly acquired if it carried our construction budget for only 190 work days of a single year, while that construction budget must go on year after year. We would be selling our birth right for a "mess of pottage."

Our Birthright

OUR BIRTHRIGHT is the privilege of providing station equipment to the subscribers' premises on a rental basis while retaining ownership and thus control of equipment.

You mention in your article that other utilities end their investment at the point of entrance to the customer's premises. Did you ever stop to consider why this has occurred and more important whether the other utilities really would like to have it this way?

Our telephone industry had an opportunity in the early years to retain ownership of the equipment at the customer's premises and very wisely exercised this opportunity. I have never heard that the gas company or the water company or the electric company ever had such an opportunity. They were confined to carrying their services only to the boundary of the customer's premises because of the way in which their industries grew.

We Lose Control

YOU COMMENT, "Sure, there would be some problems in making such a change — but aren't there problems with dial conversions, DDD and mark sensing?" I agree that there are problems at the present time, but they are within our ability to solve because we control the equipment on the subscriber's premise. Imagine what would happen if we decided to convert to dial and half of the subscribers owned their instruments and refused to purchase new ones. Would we then deny service to 50% of the subscribers who still had manual instruments? I believe we would find ourselves in the position of wanting to make technological improvements but being unable to introduce them in an orderly and progressive manner because we would not control the end piece on our system.

Instead of looking to the past let's look to the future. We face conversion to all numeral calling (ANC) in many parts of the United States simply because the rapid growth in population and number of telephone subscribers requires that we provide more central office codes than are now available. Now, under your premise, the subscriber would own his own telephone instrument. How

are we going to get him to change his present alphabetical prefix to one consisting of all numerals on the dial number plate? Do we provide a new number plate, or does he scribble across his old one with his own pencil? If he scribbles across his old one, what happens to customers who drop into his barber shop and start to use his telephone? Suppose it is a semi-public paystation instrument with heavy transient traffic?

Suppose that, in order to make a savings in investment in central office equipment and thus provide lower rates to all our subscribers, we decide to introduce pushbutton dialing co-ordinated with electronic central office switching. Are we going to tell the subscriber that before he can be connected with the nationwide telephone system, he must buy a new telephone instrument simply because we have changed our end of the equipment? And yet introduction of electronic switching could be a benefit and a savings to subscribers all across the country.

The Moving Subscriber

YOU COMMENT that, "As the movement toward individual line service continues we can see the possibility of a subscriber moving from one house to another, taking his jack and plug telephones with him and plugging them in at the new location. All we need to do is change jumpers and correct the records."

While I have no comparable figures before me for the Bell System, I know that within the Independent Telephone Industry's ten million telephones, approximately 80% are multi-party telephones and less than 20% are one-party. Let us assume that we permit the multi-party subscribers to own their telephones and carry them with them when they move. Since the average family in the United States moves once in five years, this might mean that at the end of five years 80% of the multi-party line subscribers served by the Independent Industry would have moved to a new location. In how many instances would the telephone they carried with them be usable at the new location?

First, let's look at the question of selective ringing. What are the chances that a telephone being moved from one premise to another will fit the exact ringing frequency that can be assigned to that particular premise? Not better than 50% I would say, if that much.

Now, let's look at the question of automatic ticketing. What are the chances that an instrument being moved from one premise to another, particularly from one serving company's territory to another, would fit the requirements for automatic ticketing at the new exchange? My guess would be that a very low percentage of the instruments being moved would be suitable for the new location.

Not all the advantages are with the operating telephone industry. There are reasons why the customer prefers to let the telephone company own the instrument.

Advantages To The Customer

IN THE first place, the American public prefers to buy things "on time" or to lease them rather than pay cash on the barrel head. Imagine what would happen if a new subscriber came in to apply for service and wanted three telephones in his house. Under the proposal that he own the instruments, he would have to pay us, or someone else, more than $100.00 to initiate service at his premise by purchasing three telephones.

In recent years there has been an excellent illustration of results of what you propose. I refer to the fact that the IBM Corporation for many years leased or rented its equipment and did not sell it to users. However, recently it became necessary for the IBM Corporation to make this equipment available on a purchase basis to users. I suggest that you ask your telephone friends how many of their companies have purchased IBM equipment since it has become available for purchase. In the case of our own company, we did not wish to make the investment in equipment that has a habit of becoming obsolete in a few years. It is my feeling that our telephone subscriber will feel exactly the same way with regard to the telephone instrument.

A Final Word

AL, MY friend, I think you have raised this question of subscriber ownership of station equipment with "tongue-in-cheek." It is certainly sure that we as a telephone industry are able to transfer our station equipment ownership to the subscriber but I seriously challenge the thought that it would be advisable for us to do so.

We are fortunate in having a birth right and we should hold on to it because our present method is in the best interest of the public we serve as well as ourselves.

Thanks a lot for raising the question for discussion. I certainly enjoyed thinking about it with you. Best personal regards. — *Allan R. Stacey.*

SAFETY TIP

USUALLY it takes the average driver 80 ft. to stop a vehicle going 30 miles an hour. So you can see how easy it is to get tangled up in a rear end collision.

This is one kind of accident that is definitely preventable. Here's how an expert avoids rear end collisions:

(1) Keep a minimum following distance of at least one vehicle length for each ten miles per hour you are travelling.

(2) Increase this distance even more on wet, snowy, or icy pavements.

(3) Remember that unexpected conditions in front of the car ahead of you may cause him to stop suddenly, you have to be alert and act promptly to avoid an accident.

(4) Use your rear view mirror. Give proper hand signals. Try to avoid sudden stops.

— Western Union Safety Bulletin

Electronic Communications

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"Space Communications

GOVERNMENT and industry tehnicians are developing new earth satellites to beam television programs, radio broadcasts, and phone conversations to every spot on earth equipped to receive them. The goal is a workable, worldwide communications system in space before this decade is over.

The National Aeronautics and Space Administration in its Project Echo is to fire from Cape Canaveral, Florida, a container bearing a folded balloon that will inflate in space into an aluminum-coated sphere 100 feet in diameter. Toward this target, technicians will beam powerful radio signals from a transmitter on a hilltop in Holmdel, N. J. The signals will bounce off the balloon's smooth metallic cover and be picked up by super-sensitive ground receiver in Goldstone, California, clear across the country. In turn, the West Coast station will talk back the same way.

Echo's immediate aim will be to test the quality of radio signals transmitted by a passive satellite, one that contains no electrical gear but simply mirrors signals sent to it. Ultimately, space officials say, the U. S. could orbit dozens of inflated Echo satellites for relaying messages around the world.

Meantime, Pentagon scientists are devising a more advanced satellite called Advent, which will carry its own receiving, amplifying and transmitting equipment to relay TV and voice signals. Launching of this so-called active communications satellite, expected to weigh more than 600 pounds, is set for about two years from now.

Communications experts foresee satellites as a promising means for expanding overseas telephone facilities, and perhaps the only way to establish global TV networks.

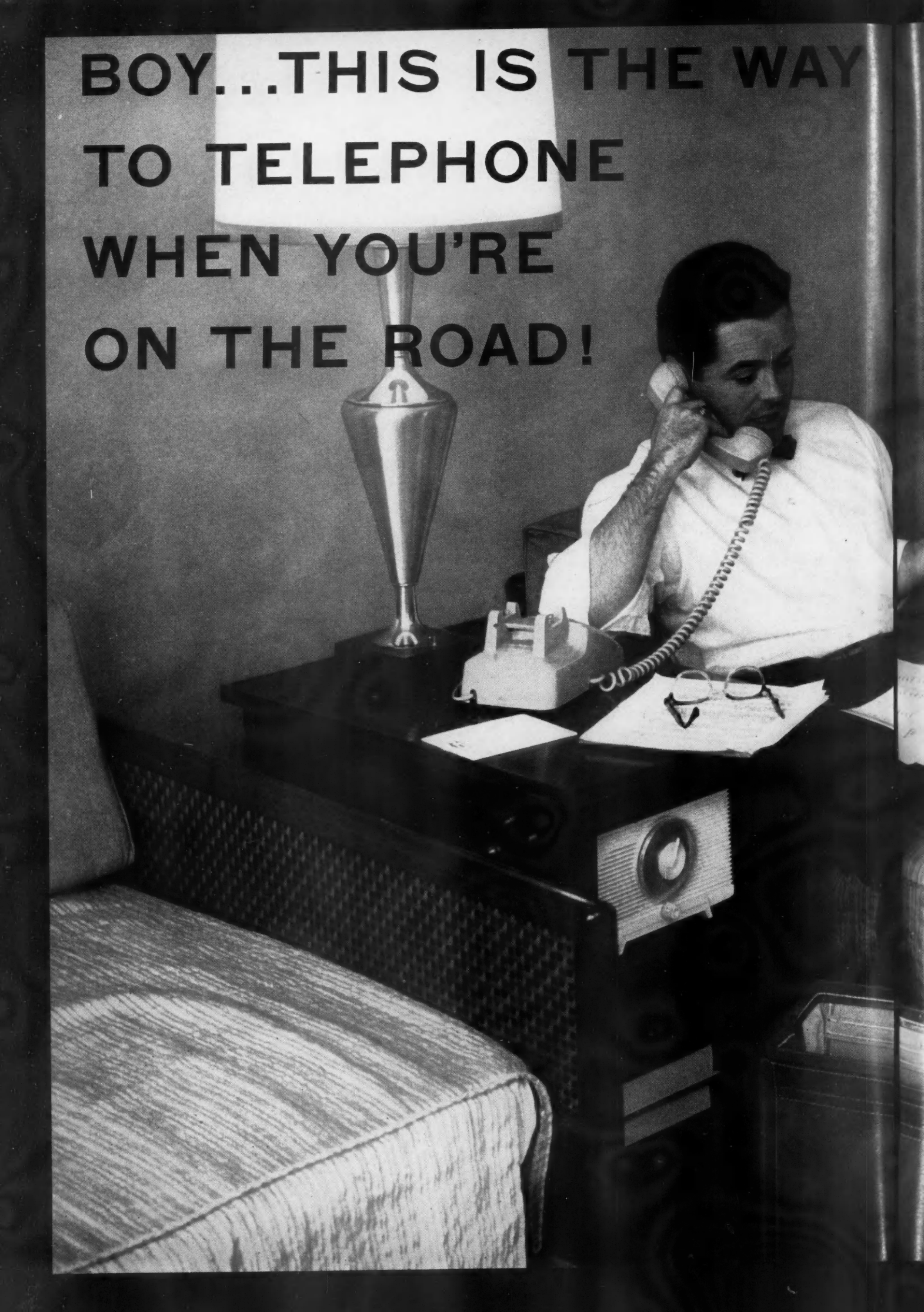
Transatlantic cable circuits, now totaling 36 voice channels, already fall short of the message demands. Even with planned expansion, these lines would total less than 100 telephone channels across the Atlantic, and a single TV channel requires the equivalent of 1,000 telephone channels. TV signals cannot be beamed directly between widely separated points, such as the U. S. and Europe, because the signals go in a straight line and would not follow the earth's curvature. And a network of TV coaxial cables crisscrossing the globe would be prohibitively expensive.

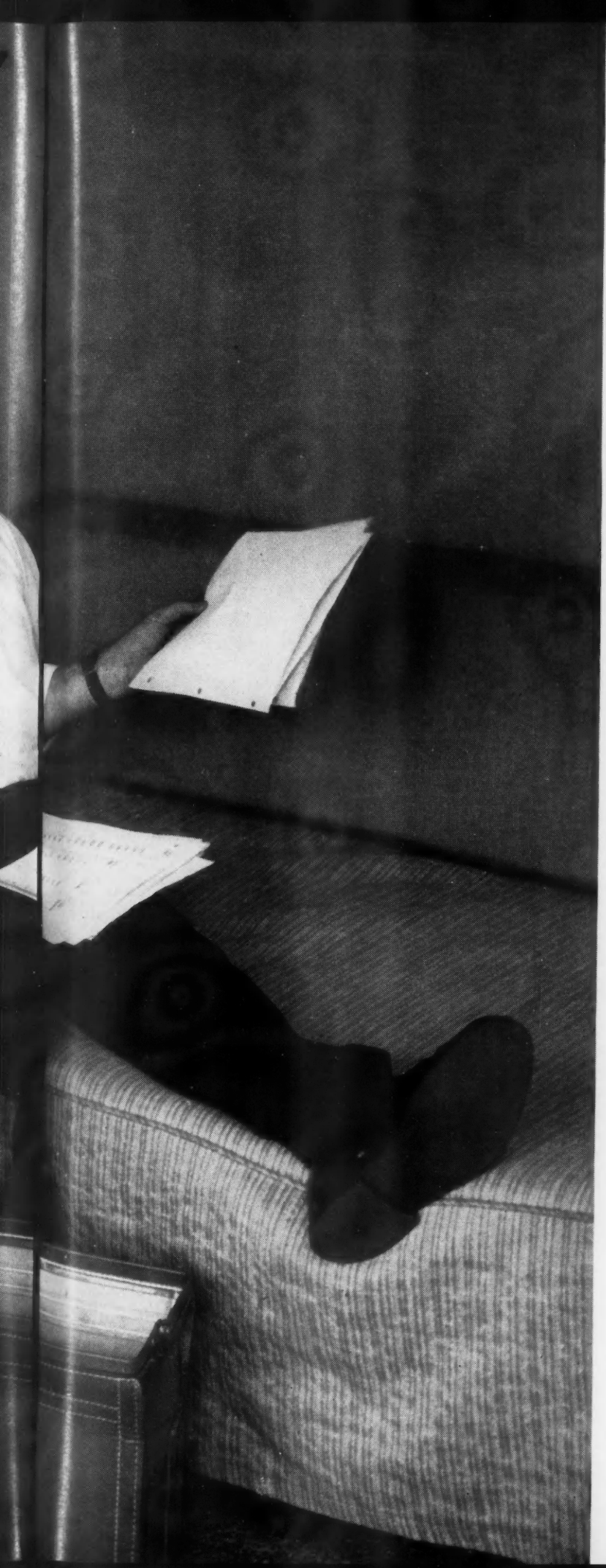
Bell Telephone Laboratories has "high hopes" of using satellites for transmitting telephone conversations overseas in the future, reports Dr. John R. Pierce, the labs' director of research on communications principles.

Dr. Pierce mentions some of the problems that must be solved to obtain effective communications satellites. "There's a question of how one can restrict and control the uses of satellites that are put up in the sky. If one just puts up a satellite and allows a lot of people access to it, when they all get in a hurry you will end up by having no communication because messages will all jam with one another." Other potential trouble areas, according to Dr. Pierce are: Linking satellite communications with systems already in use, such as ordinary telephone circuits and radio relay setups, and the costs of replacing big satellites in orbit when they fail.

The first Echo satellite, coated with highly reflective aluminum for easy sighting, is slated to remain in orbit for two weeks after being lofted into space. It will orbit over every portion of the U. S. except Alaska and over parts of Canada and Europe. The Government space agency is inviting scientists generally to bounce their signals off the huge sphere, but the big test will be

Please turn to page 40


BOY...THIS IS THE WAY
TO TELEPHONE
WHEN YOU'RE
ON THE ROAD!



Not many years ago you had to hunt up a phone if you were staying at a motel and had a call to make.

But nowadays you can telephone comfortably in the privacy of your room at many motels (and the number is growing constantly).

The reason for this pleasant change is that motel owners have discovered that room phones fill rooms. Helping them discover this has been the job of a continuing Bell System advertising campaign which runs in the principal trade magazines.

And, in these same magazines, the Bell System also promotes the idea of calling ahead to secure future reservations for departing guests.

Here's nationwide advertising, then, that works hard for the whole telephone industry . . . by selling phones for rooms, and by stimulating both local and long distance usage.

BELL TELEPHONE SYSTEM

whether it can transmit clear signals between the East and West Coasts.

Technicians will carefully track the sphere as it passes around the globe, feeding this information to transmitting stations so they will know just where to direct their narrow radio beams to hit the orbiting satellite. Holmdel on the East Coast and Goldstone on the West Coast will alternate bouncing voice messages off the satellite.

The relative cheapness and simplicity of Echo balloon satellites make them ideal for early communications experiments, according to space officials. But most technicians pin their future hopes for practical world-wide TV and new phone links on heavier satellites, such as Advent, which carry radio gear to relay signals.

New Semiconductor

SCIENTISTS at Bell Telephone Laboratories are developing methods of growing single crystals of a transparent semiconductor, gallium phosphide, and studying its properties. These studies will help in the basic understanding of high energy gap semiconductors. The material is transparent, making it possible to observe visually the differences which take place under varying conditions of doping and electron density.

Gallium phosphide belongs to the family of semiconductors referred to as "III-V compounds," which are composed of elements taken from each of the III and V groups of the periodic table of atoms. Knowledge gained in studying it should be applicable to other members of this group, such as gallium arsenide and indium antimonide, which have shown promise in devices such as point contact and Esaki diodes.

Although the semiconducting properties of gallium phosphide were first reported in 1954 by G. G. Folberth and F. Oswald in Germany, pure samples have been very difficult to prepare. One of the main problems is that it decomposes at temperatures near its melting point unless it is held under high pressures of gaseous phosphorous. Single crystals of gallium phosphide are being produced experimentally by the floating zone melting technique, using special equipment built to withstand the high pressure phosphorous atmosphere.

In the experimental equipment, an ingot of gallium phosphide is enclosed in a sealed quartz tube which is encased within a steel pressure chamber equipped with viewing ports. At the temperatures of 1450° to 1500° C (2640° to 2730° F) and pressures of 10 to 50 atmospheres pressure, the walls of the quartz tube fog over, making observation of the molten zone difficult. This fogging affect is prevented to a large extent by heating the walls of the apparatus to above

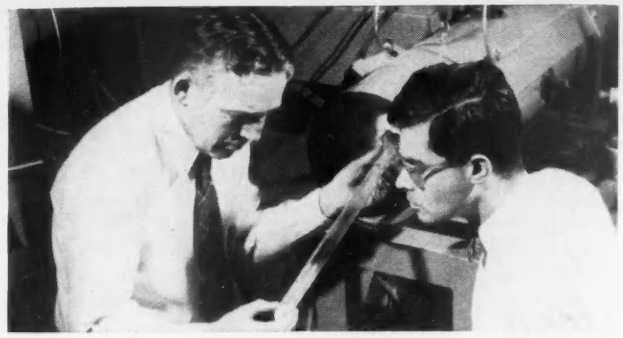


FIGURE ONE: — Carl Frosch (left) and Murray Gershenzon, Bell Telephone Laboratories, inspect an ingot of gallium phosphide which has been zone melted in an attempt to produce single crystals of this III-V compound semiconductor. Diodes produced from the material show promise for high temperature operation, and as electroluminescent structures.

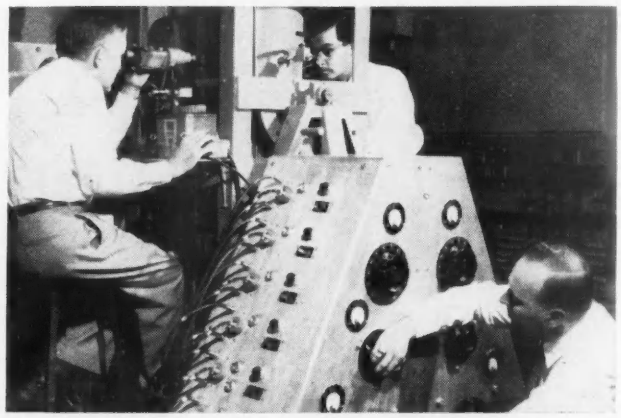


FIGURE TWO: — Carl Frosch (left) watches the molten zone in an ingot of gallium phosphide which is being float-zone melted under pressure at Bell Telephone Laboratories. Murray Gershenzon watches the operation through the opposite observation port, while Robert Mikulyak adjusts the current through the coils used for heating the ingot.

950° C. Single crystals about ¾ inch long by ¼ inch square have been obtained with this apparatus. (*See Figures One and Two.*)

Small single crystals have also been grown by vapor reaction methods in which gallium suboxide (GA_20) and phosphorous combine in the vapor phase. These crystals show a whisker form. They are usually n-type semiconductors, although they can be doped to obtain the p-type. They exhibit free carrier concentrations of 10^{11} to 10^{14} per cc, as calculated from resistivity measurements.

Diffused and alloyed type diodes have been produced. Sample diodes have shown breakdown voltages as high as 35 volts, rectification ratios up to 3×10^6, and good performance up to 500° C (900° F). These diodes have an almost intrinsic layer which gives rise to a current-limiting series resistance, and they possess recombination-generation centers within the junction transition region. These produce variations in the forward and reverse current characteristics, and time lags in the establishment of steady state conditions.

"Modern Cable Construction"

(Continued from page 28)

ing, it is recommended that the couplings be kept in warm atmosphere before applying or pre-heated by dipping in a pail of warm water. Once the coupling is installed, there need be no concern about the effect of cold temperatures.

The method shown in *Figure* 332 is recommended for joining conduit sections with plastic couplings, to prevent damage to the coupling and to secure a tight joint on both sides of the coupling.

When the coupling is hit by hand, it can be made tight enough on the conduit end. Then hitting the bare end of duct with a hammer on a piece of wood laid on the conduit end, the force of impact is transmitted through the solid conduit section, driving the other end into the coupling. Joining in this manner will assure a tight joint on both sides of the coupling.

If the coupling is hit directly with a hammer, the coupling will take the force of the impact. As the plastic will yield, the coupling will be driven more than necessary onto the duct taper and the end of the duct will be beyond the middle of the coupling. Under such a condition, the other end of the conduit section cannot be driven sufficiently into the coupling. Thus, the coupling will be tight on one side only and not tight enough on the other.

Since the ends of the conduit sections are tapered, the outside diameters of the couplings and the conduit sections are equal. This enables banks of ducts to be built up with the horizontal tiers and vertical rows directly in contact as illustrated in *Figure* 333, thus permitting narrower and shallower trenches, reduction of installation time and saving on the amount of concrete when the ducts are encased.

This procedure replaces the older practice of using spacers between the ducts so that the backfill material or concrete would fill the interstices between the ducts. Furthermore, the usual "A" frames which hold the group of ducts until the backfilling is completed on the sides of the duct

FIGURE 335: — The "C" telephone duct can be readily splayed for entering manhole or passing constructions.

bank have been found to be unnecessary. Instead, the shape of the duct bank can be retained by dropping some fill material along the sides of each section of duct between the couplings, between the trench wall and the ducts. Afterwards, the backfilling operation will compact the ducts together permanently.

The trenching operation may be handled in such a way as to lay the conduit sections directly behind the trencher as depicted in *Figure* 334. In this manner, the amount of open trench may be kept to a minimum, which is a particular advantage where traffic is heavy. This method is successful in conduit laying operations not requiring concrete encasement.

The asbestos-cement conduit is easily cut in the field by means of a six-point rip saw or a large frame backsaw equipped with a molybdenum steel blade. The manufacturer will also provide cutting and end tapering tools for use in extensive conduit laying jobs.

The conduit sections may be splayed out as shown in *Figure* 335 or a plugboard may be mounted in the duct opening of a previously constructed manhole to line up the conduit sections for grouting in the opening as indicated in *Figure* 336.

Curves in conduit lines of "B" or "C" ducts may be constructed with alternate curved and straight segments as shown in *Figure* 337. It is also possible to pass around obstructions by constructing an "ogee" or reverse curve with curved and straight segments.

On main bank construction, curved sections will usually have a large radius. To facilitate curve-making with asbestos-cement conduit, there

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The Editors.

is available as a standard fitting a 3-degree segment of 10 ft. radius, about 6¼ inches long, and tapered at both ends. Also available are short lengths of 1 ft., 1½ ft., 2 ft., 3 ft. (or 3 ft. 3 in.), 4 ft., and 5 ft. sections tapered at both ends. The 3-degree curved segments in combination with these short lengths will help keep the installation cost down. The availability of short lengths will keep the need for field working to a minimum.

Standard sweeps of 12 ft. 6 in. radius will be found useful. Some-

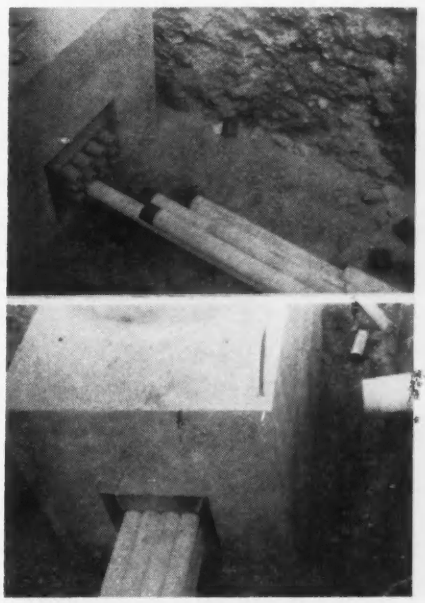

FIGURE 336: — Upper view — Use of plugboard for quickly joining duct line to a previously constructed manhole. Length of joining section can be easily cut and "folded in" to fit adjacent duct. Lower view — Showing all duct sections in place and ready for grouting in place at manhole opening. After grouting is set, the plugboard is removed.

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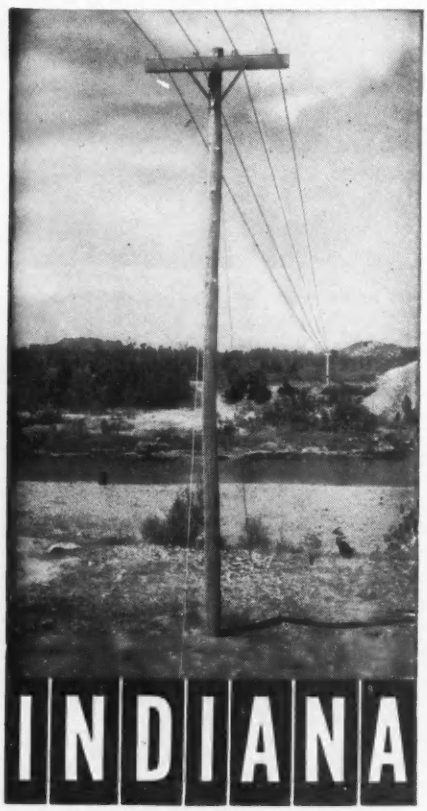

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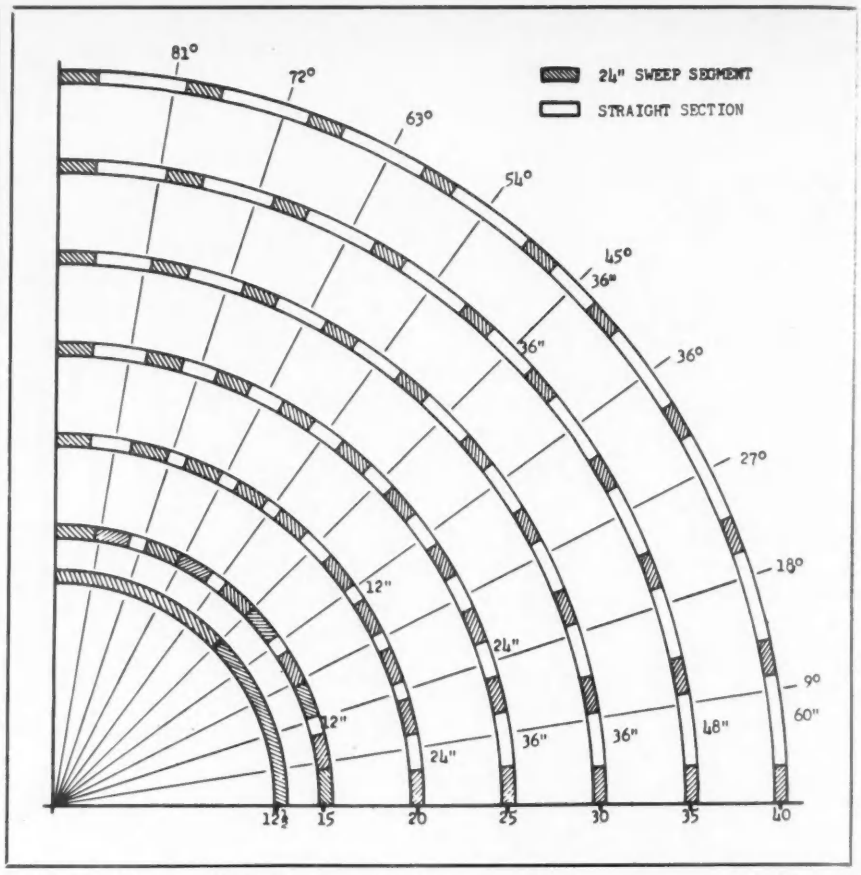

FIGURE 337: — Method of constructing an asbestos-cement conduit line of different radii of curvature.

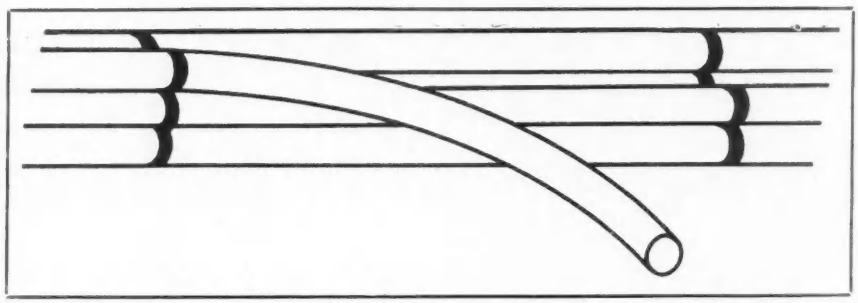

FIGURE 338: — Use of bend to connect to lateral or riser for cable.

times these sweeps are cut into halves or thirds to get around small curves.

The conduit sections may be transposed without the use of special segments by taking advantage of the flexibility of the plastic couplings to slant successive sections of the conduit out of line until a 90-degree twist of the duct line is achieved.

The asbestos-cement conduit is well suited for making lateral connections using bends as shown in *Figure* 338. It can be joined to a steel pipe bend on the riser pipe. Conduit bends of asbestos-cement may be used for underground cable entrances to CDO buildings, since they cost less than steel pipe bends and are much easier to install.

In using the standard asbestos-cement bends, the manufacturer cautions that if a high tension will be built up on the bend in pulling in the cable, it would be advisable to use steel bends. On heavy pulls, the steel winch line used in pulling the cable may cut through the side of the asbestos-cement bend. Many telephone companies have standardized on steel or cast iron bends, when using the conduit on lateral construction to avoid any possible damage from heavy pulls. — *To Be Continued.*

In the next chapter Mr. Reed will discuss (1) *fiber conduit and* (2) *plastic conduit, giving manufacturing information and complete data on installation.*

"Not According To Spec"

(Continued from page 26)

mask, and most of them would have lost much more than they did rather than reveal that they were patrons of the place.

The local police and the newspaper men knew all about it, except for Jock's identity; but they dropped the matter like a hot coal. Nothing appeared in print.

Jock went to work on Monday as usual. Three weeks later, as floating linemen inevitably "blew the job," he blew. He told me that he would not attempt to sell the loot within 500 miles of the place. He indicated not the slightest feeling of wrong doing; to him it was quite appropriate that he should "stick the soandso hypocrites" who posed as community leaders while they broke their own laws. Perhaps he was right. A few months later a man was killed in the place and that ended it. I never heard another word about Jock. — *To Be Continued.*

Alumina Powder For Potting Electronic Components

IN A BASICALLY new approach in the protection of electronic components, alumina powder (aluminum oxide) is being successfully used by the Bell Laboratories to insulate or "pot" transformers and other technical components within hermetically sealed cans.

Popular potting compounds include mineral-filled asphalts such as sand asphalt, which has good heat transfer properties but melts at the relatively low temperature of 275-300°F. When it melts, it expands, threatening the hermetic seal and often damaging the components.

Alumina powder is said to be free from these disadvantages. Its melting point is over 2700°F, well above the operating temperatures of any electrical apparatus. It can be poured into a metal can and can then be hermetically sealed. The powder does not expand or contract to any noticeable extent under wide fluctuations of temperature, so no strains are imposed on the components. Also, it doesn't need to be cured or vulcanized for use, as some of the plastic potting compounds do, and thus no strains develop from these processes.

The powder differs from asphalts, epoxy resins, and other similar potting compounds, in that it maintains its dry, granular form in use. The electrical component can be easily removed for inspection or repairs, simply by breaking the seal on the can and pouring out the powder.

Alumina is completely inert. Thus, there is no fire hazard, either during potting operations or in use, in contrast to inflammable asphalts or resins. Since alumina is stable to such high temperatures, it can be used as a single potting compound to cover the gamut of temperature ranges.

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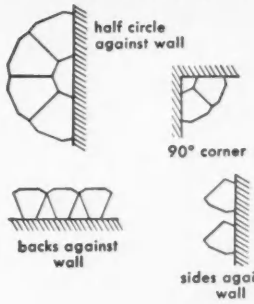

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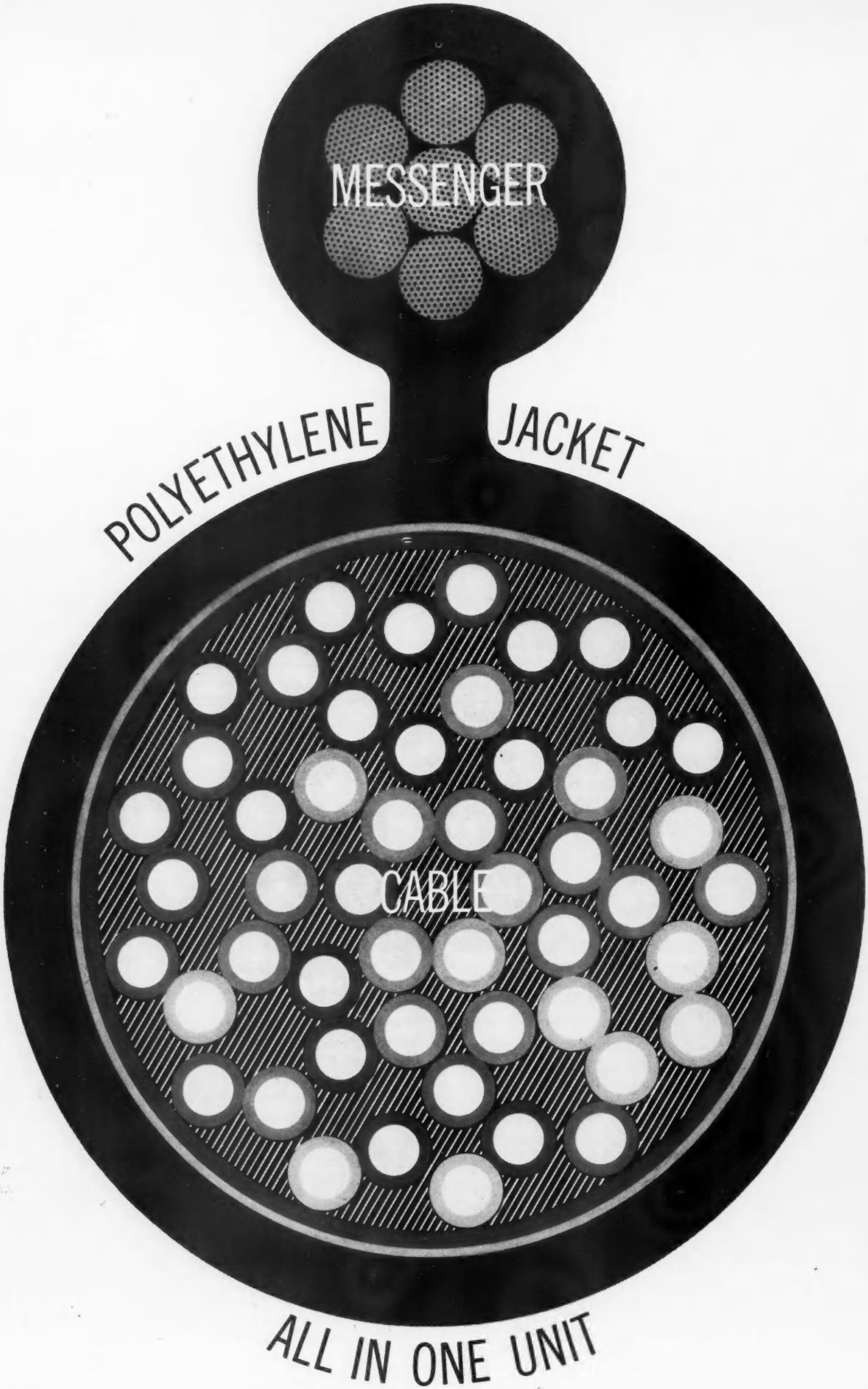
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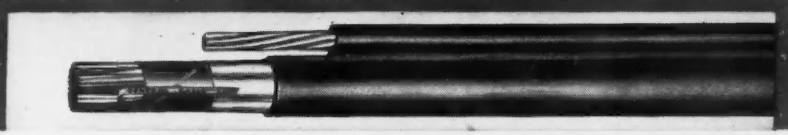


New Products' Showcase

SUPPLIES AND EQUIPMENT

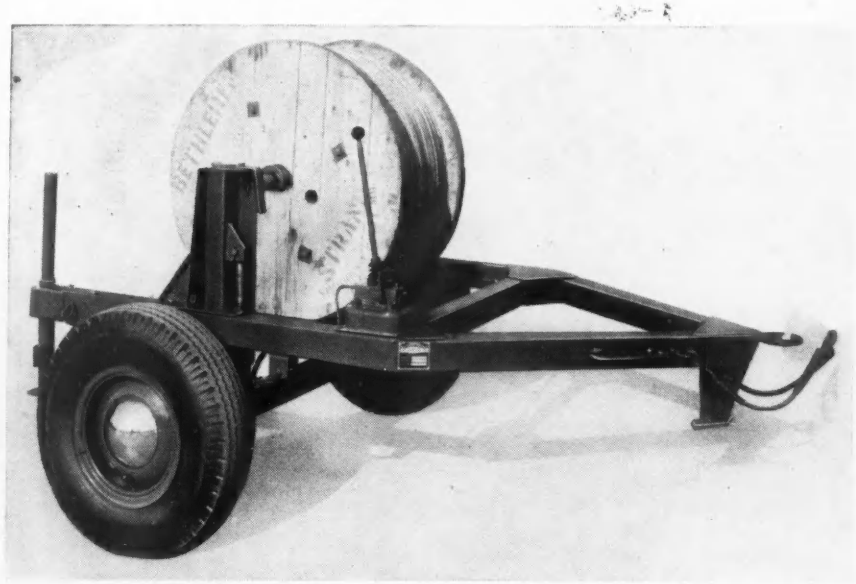
By DICK REYNOLDS

Cable Reel Carrier

A LIGHT-DUTY hydraulic cable reel carrier has been announced by Baker Equipment Engineering Company. While the Model HWSC carrier is primarily designed for towing behind a ½, ¾ and 1-ton truck, it can also be towed just as well behind a truck of larger capacity.

The reel carrier is rated at 2-tons payload capacity, will accommodate reels up to 56″ in diameter and 42″ in width, (also available on special order to accommodate reels up to 55″ wide), and will pick up reels as small as 18″ in diameter with carrier level. Approximate weight 930 lbs. without brakes; 1010 lbs. with brakes.

Unit is available in three combinations: (a) for hauling cable reels only; (b) for hauling cable reels and as a freight carrier; (c) for hauling cable reels, freight and also as a pole hauling carrier. *Check NP* 489.



Cable Reel Carrier from Baker Equip. Engrg. Co.

Safety Hand Hoist

A NEW 1-ton safety hand hoist has been announced by Ratcliff Hoist Company. The maker claims this hoist will not free-chain under load, even if control lever is tripped accidentally; nor will it free an interrupted load.

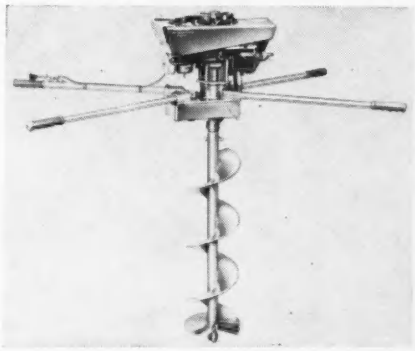
The handle is 14″ long and operates in 12 different positions; 60-

pound pull raises full load; 5/16″ raise or lower per stroke permits precise spotting of load. Headroom requirement is 10⅜″. Housing design enables operator to rig hoist flush with wall, pole, or other working surface. A single lever controls up, down or free-chaining.

The hoist weighs 13½ pounds and stores in 20″ x 5″ x 5″ space. It can be completely disassembled and put back together in about five minutes. *Check NP* 490.

Two-Man Portable Drill

THE GENERAL Equipment Company has recently introduced a new heavy-duty portable two-man power drill. Called the General Model 32 earth and ice drill, this machine has a 2½ hp 2-cycle air cooled engine with automatic rewind starter, straight-in-line drive with balanced torque control for easy handling, balanced transmission with extra gear reduction to drive larger augers in difficult conditions, and a heavy duty centrifugal clutch which disengages at idle speeds. The automatic clutch acts as a safety device protecting the operator and the machine by disengaging when rocks and other obstacles are struck. Finger-tip throttle control gives the operator instantaneous control of the machine for starting and stopping.



Unit weighs less than 50 lbs. with an average size auger, and comes complete with 10″ auger. *NP* 491.

Aluminum Connector

"JIFFY JOINT," a new single-sleeve aluminum connector for ACSR and aluminum alloy conductors, is now available from Rome Cable Division, Aluminum Company of America.

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BILL: Better shoot us 30,000 feet of drop wire . . . 6 boxes of repair splicing sleeves . . . 15,000 feet of 11-pair and 30,000 feet of 6-pair rural distribution wire . . . and a couple of hundred crossarm bolts, lag screws and anchor rods. How soon can we expect delivery?

FRED: Tomorrow morning O.K.?

BILL: Fine. And Fred—stand by for more rush orders—if I can get through.

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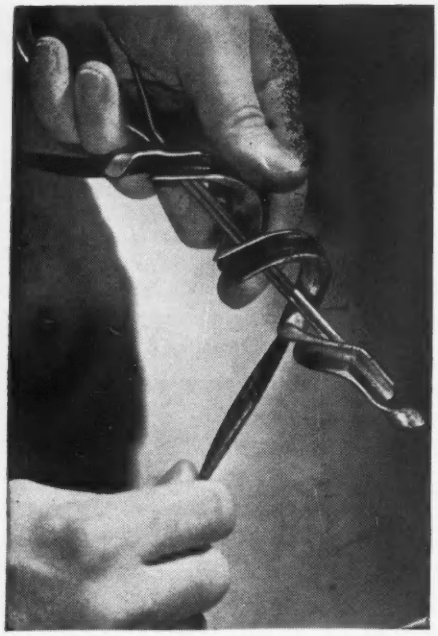

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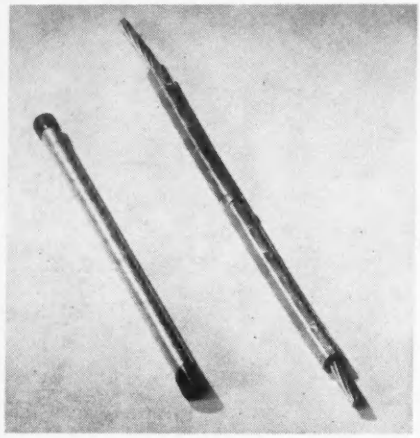
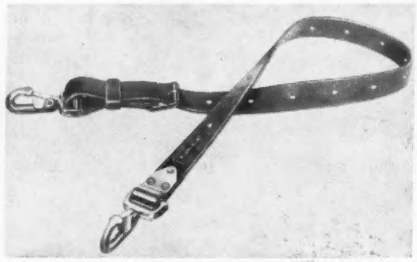


the same as joining all-aluminum conductors. Available in a range of sizes to join ACSR from No. 4, 6/1 stranding, through 477 M.C.M., 18/1 stranding, the connector is shown compressed (No. 2 6/1) and as it comes to the field (No. 4 7/1), filled with compound and complete with protective plastic end caps. *NP* 492.

Nylon Safety Strap

MATHIAS KLEIN & Sons has announced the development of new "Klein-Kord" Nylon Safety Straps. These straps are woven from filament nylon and are capable of test



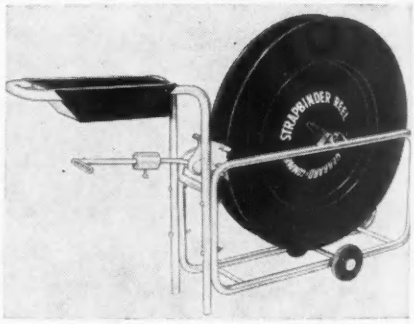
load of 2750 lb. Also the multiple plies of woven, pre-dipped nylon are frictionized in neoprene and vulcanized. All buckles and snaps are drop-forged by Klein in their own forging shop. *Check NP* 493.

Mobile Strap Dispenser

A NEW MOBILE steel strap dispenser that eliminates lifting of heavy steel coils has been introduced by A. J. Gerrard & Company. Designated Model 416, the new dispenser handles ⅜, ½, ⅝ and ¾-inch wide vibrated wound flat strapping and all sizes of oval steel strapping.

The unit consists of a tubular steel frame and reel mounted on two wheels. Dispenser is 10½ inches wide and is designed for easy handling in narrow aisles. Since the wheels are mounted near the center of balance, the dispenser can be moved about with a minimum of effort. A built-in tray on the handle provides carrying space for seals and strapping tools.

Loading of the dispenser is accomplished by tipping it on end and unlocking reel so that it rolls out of



the dispenser. Reel is laid flat on floor, a lock nut removed and one side of the reel taken off. Strapping is placed on reel, the side replaced and locked. The loaded reel is then rolled into the dispenser. Unit is tipped back into its normal operating position and is ready to dispense strap. *Check NP* 494.

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O. E. Emley Retires From Sunland-Tujunga Tel. Co.

O. E. EMLEY, plant superintendent of the Sunland-Tujunga Telephone Co., Sunland, Calif., retired June 30, it has been announced by Allan R. Stacey, vice president and manager. Although June 30 was the official

O. E. EMLEY

retirement date, Emley's last day at work was June 10. He is now enjoying his favorite hobby — fishing — on an extended vacation in northern California and Oregon.

Emley came to Sunland in 1932 from the Associated Telephone Co., Ltd., Santa Monica, Calif., and has engineered and supervised the outside plant construction and installation for 28 years. He scrimped through the depression in the "30's" and struggled with the shortages during World War II and the rapid growth and expansion in the postwar years.

At the same time Stacey announced additional changes in company personnel: W. J. Ure, equipment superintendent, has been promoted to chief engineer and will be responsible for the entire plant operation, both "inside" and "outside," with Equipment Supervisor Norman H. Beach and Plant Supervisor Noel Kelly working under his direct supervision.

Herbert Elected V. P., Gen. Tel. Co. of Pa.

ELECTION of John C. Herbert as operating vice president of General Telephone Co. of Pennsylvania has

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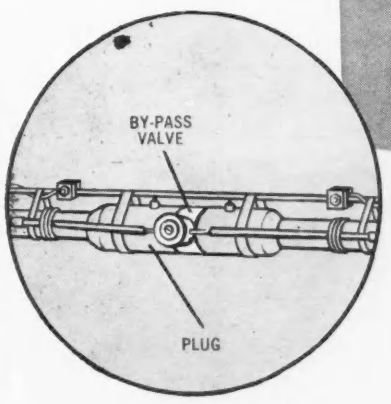

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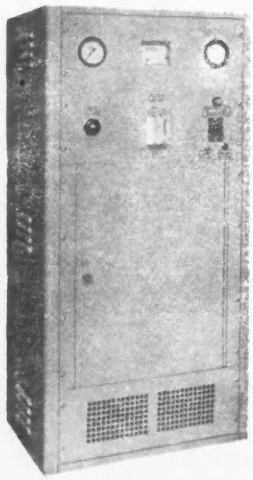

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Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 50 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, humistat and hour meter.

S & G developed the Dry Air Dehydrator used extensively by many operating companies to protect telephone cables from moisture. Many hundreds of these units are now operating satisfactorily and economically.

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order through your favorite distributor; for information, write or phone

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DESIGNERS AND MANUFACTURERS OF
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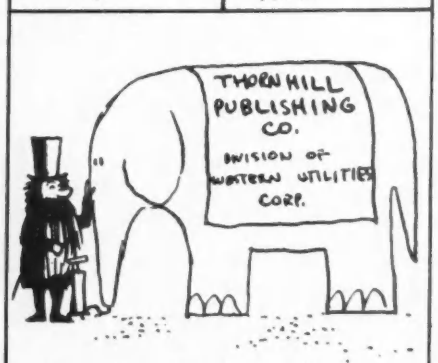

A complete telephone directory publishing service.

Offices:

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ADDRESSOGRAPH

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Full Price $700

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Telephone Engineer & Mgmt.
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Chicago, Illinois
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been announced. Herbert has served as general commercial manager of the company since April 1. Prior to then he had been commercial manager of York Telephone & Telegraph Co.

General Telephone Co. of Pennsylvania, with divisions in Erie, Johnstown, Oil City, Somerset, Sayre and Vandergrift, assumed responsibility for the operation of York Telephone & Telegraph Co., following acquisition of the York firm by General's parent firm, General Telephone & Electronics Corp., in 1959.

A native of Harrisburg, Herbert is a veteran of the telephone industry, having started as a part time installer while still in high school. Herbert received a Bachelor's degree in electrical engineering at the Pennsylvania State University and a Master's degree at Massachusetts Institute of Technology.

He was employed by Radio Corporation of America in radio receiver research at Camden, N. J. and later was general manager of the Union Electric Co., a subsidiary of United Telephone Co., Indianapolis, Ind. before becoming associated with York Telephone and Telegraph.

Lorain Tel. Co. Announces Organizational Changes

The Lorain (Ohio) Telephone Co. has announced that Herman E. Hageman, president, has been elected chairman of the board of directors. During his term of office as president of the company, since 1938, the number of telephones in service increased from 8,603 at the end of 1938 to 41,193 as of May 31, 1960. In the same period, investment in telephone plant increased from $2,000,000 to approximately $15,000,000. Since 1938, Hageman has also been president of The Lorain County Radio Corp., which pioneered the development of Ship-to-Shore radiotelephone service on the Great Lakes.

Hageman has given generously of his time to many other organizations. He has served as director and president of Lorain Chamber of Commerce, director and three-term president of Ohio Independent Telephone Association, trustee of Elyria Metho-

dist Home, trustee of Endowment Fund of Methodist Church of Ohio, member of Defense Communications Board during World War II.

At present, Hageman is a director and past vice president of the United States Independent Telephone Association, director of The Lorain Banking Co., director of Lorain Goodwill Industries Advisory Board, Life Trustee of Ohio Wesleyan University, trustee of First Methodist Church, member and past president of Lorain Kiwanis Club.

James C. Hageman, vice president and treasurer, has been elected president of The Lorain Telephone Co. The new president received his BA degree in Business Administration at Ohio Wesleyan University in 1932, and his MBA degree in Public Utility Management at the Harvard Graduate School of Business Administration in 1934. He first was employed by the company as an accountant in June 1934; he became a director in 1938, assistant secretary in 1944, secretary in 1945, and vice president in 1946. Since 1940, he has held the position of vice president and treasurer. He is vice president, treasurer, and director of The Lorain County Radio Corp.

Harold W. Werner, secretary of the company, has been elected vice president and secretary, and Robert E. Trinter, assistant secretary, was elected treasurer. He is also secretary and a director of The Lorain County Radio Corporation.

Laurence W. Miner, who has been associated with The Lorain Telephone Co. for 12 years in various accounting capacities, was elected assistant secretary and assistant treasurer. Prior to coming to Lorain, he was with The General Telephone Company of Ill., Investors Telephone Co. of Iowa and North Carolina, and The Elyria Telephone Co.

Stromberg-Carlson Names Poole Atlanta Sales Rep.

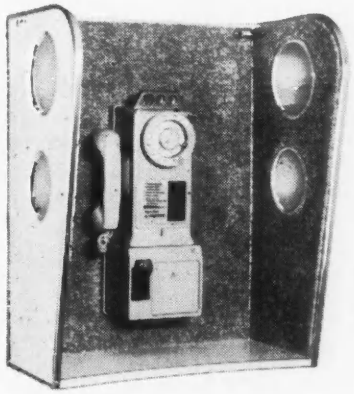
ROBERT E. POOLE, Jr., has been appointed an industrial sales representative in the Atlanta Branch of Stromberg-Carlson's Telecommunication Division, according to an announcement by T. C. Thompson, gen-

MODEL GP4020

ACOUSTIC .... ATTRACTIVE ... EASY TO INSTALL & MAINTAIN .... HIGH QUALITY ... VARIETY OF MODELS & SIGNS ..... DECORATOR COLORS .....

"Shelf-ettes"

BY GLADWIN



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Increase your revenue with modern, attention-getting telephone mountings. Especially designed for hard usage, SHELF-ETTES add prestige and beauty to any locale. Available in a variety of models ... in decorator colors. Many Knock-Down units with interchangeable parts. Modern, attractive signs ... lighted or non-lighted. Directory shelves are easily attached to SHELF-ETTES. Three basic backboard materials are used: Formica, Perforated plastic, and Carpet. Gladwin's SHELF-ETTE provides the most outstanding public telephone mounting available in the industry.

•**Model GP4020** — Built in lighted top design. Formica or nylon carpet (Acoustic) covered backboard; Formica covered shelf. **Model GP4010 CP** — Acoustic carpet interior. Shipped knocked down. **Model GP4010 C—List 2**—Nylon carpet (Acoustic) covered backboard (or without backboard); Formica covered shelf. Shipped knocked down.

FOR FURTHER INFORMATION WRITE OR PHONE DEPT. S

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CONDEX* MULTIPLE CONCRETE CONDUIT

Special fittings — miters — —short lengths — expanded web sections available, also adapters to claytile, transite and fiber duct.

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Pre-Con of Quebec, Ltd., Montreal, Quebec, Canada. Home Office: Brampton, Ont. Tel: HUdson 1-3942 (Toronto)
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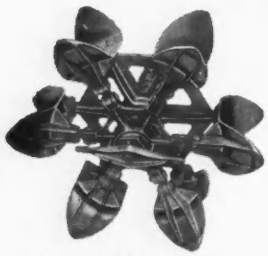
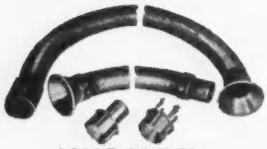


C-R POWER REEL

SLACK PULLER



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Graybar Distributed by Graybar Electric Company

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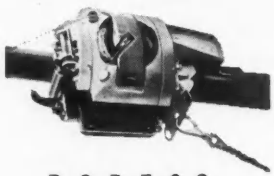


B, C, D, E, & G CABLE LASHERS

Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

eral manager of commercial sales Stromberg-Carlson is a division of General Dynamics Corp.

Poole will serve major industrial and government procurement agencies in the Southeast territory, under the direction of W. L. Mollands, Atlanta Branch sales manager. He will be responsible for the sale of telecommunication equipment and components, including carrier/microwave systems, supply materials and industrial type products.

A long-time resident of the South, Mr. Poole is well acquainted with the area he will serve. He was born in Crewe, Virginia, and for the past 14 years has worked in that state. In 1946, he started with the Chesapeake & Potomac Telephone Co. of Virginia, in the plant department. He gained further experience as a PBX installer and repairman, and later joined the United States Instrument Corp. as a sales engineer working out of Charlotesville, Va.

Leslie J. Gaddis Closes Long Career With AE Co.

LESLIE J. GADDIS, staff sales engineer, has closed a long and distinguished career with Automatic Electric Sales, after half a century

LESLIE J. GADDIS

of service with the subsidiary of General Telephone & Electronics Corp., at Northlake, Ill.

The genial, well-known telephone figure started as an office boy. After completing his high school education at night, he took a four-year

course at Lewis Institute to further his training in electrical engineering.

In 1916, following a series of shop assignments, Gaddis became an installer. He became a staff engineer in 1926 and later served as sales manager for the Western and Central districts. He returned to the Chicago office in 1945 as a staff sales engineer. Highlights of his record include selling the first automatic toll ticketing installations in the states of Louisiana, Nebraska, Illinois, and Wisconsin.

In addition to his achievements in sales, Gaddis has been honored for his ideas. He wears a diamond-studded ring, resembling a telephone dial, which was presented to him in 1925 for his helpful suggestions.

Although he traveled about 65,000 miles a year, he still had time to become a registered professional engineer of Illinois, and a member of the Independent Telephone Pioneer Assn.

Mixed in with his impressive professional career is an equally impressive record in athletics. When AE won the Chicago Industrial Baseball League championship during the 1921-23 seasons, L. J. Gaddis was one of the team's strongest pitchers. He's also quite a bowler and plays a fine golf game.

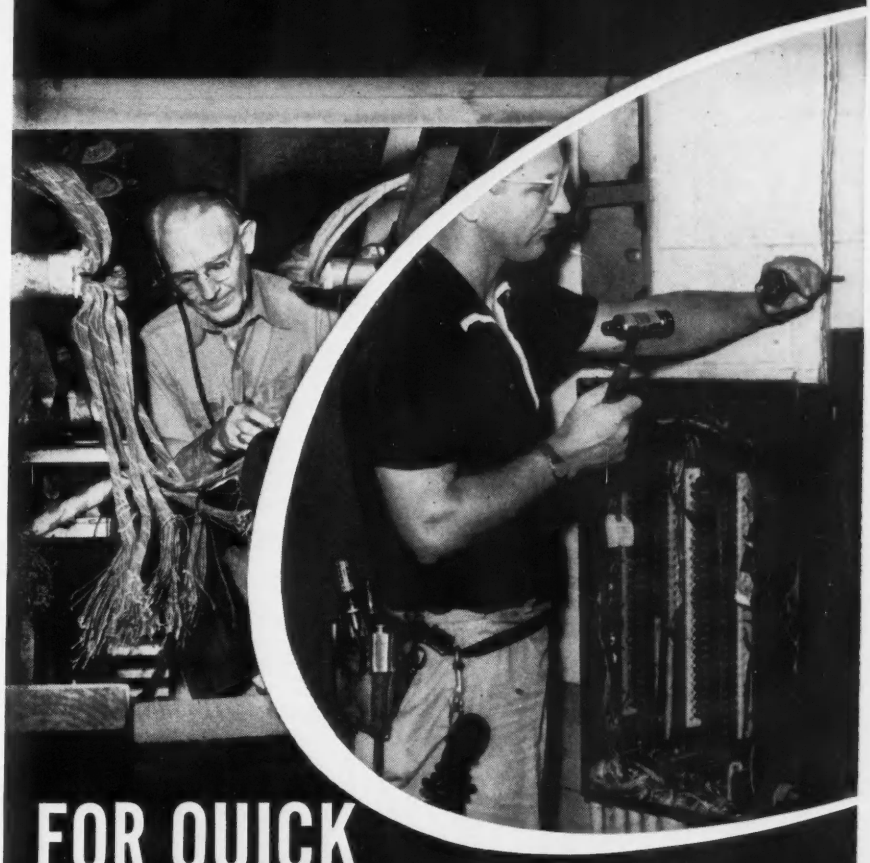
During his long career, he has satisfied scores of customers. Sales officials have received numbers of letters complimenting the company for, as one letter put it, "having such a helpful and pleasant person serve our territory."

Gaddis' career was best summed up in a letter from a large Independent telephone company: "The contributions that you have made to the industry and the friends that you have won in and out of the industry will stand as eloquent testimony to your service."

H. G. Cook Appointed Director of Graybar

GRAYBAR Electric Company, Inc., has announced the election of H. G. Cook, district manager at Cincinnati, Ohio, as a director of Graybar. Cook replaces former Graybar Treasurer F. E. Gibson, who retired recently.

Experienced installers use SHURE-SET



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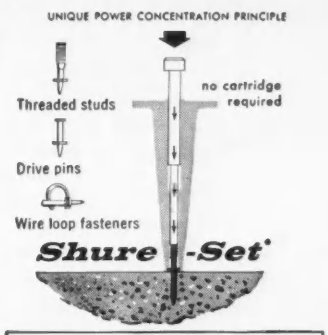

Newly-patented hammer actually absorbs shock, increases power and reduces worker fatigue. Ask for model R-400.

other products by

Looking for a way to speed fastening time and reduce mess on every job? Shure-Set is the best answer . . . a lightweight, versatile, easy-to-use tool with proved ability to set rugged fasteners into concrete, block or masonry quicker and easier than old-fashioned methods. No pre-drilling, no cartridge—a few hammer blows and the job is done! Approved Shure-Set tools and fasteners are precision-made of the finest materials, assuring maximum dependability and trouble-free service.

Here's another advantage—the Shure-Set tool doubles as a masonry drill holder, for use where "tap-and-turn" drilling may still be required. Versatility . . . dependability . . . worker acceptance . . . efficiency . . . wide selection of austempered fasteners . . . all good reasons for you to call your Shure-Set or Ramset dealer (under "Tools" in Yellow Pages), or write us direct for cost-cutting details.

Ramset® Fastening System

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WINCHESTER-WESTERN DIVISION
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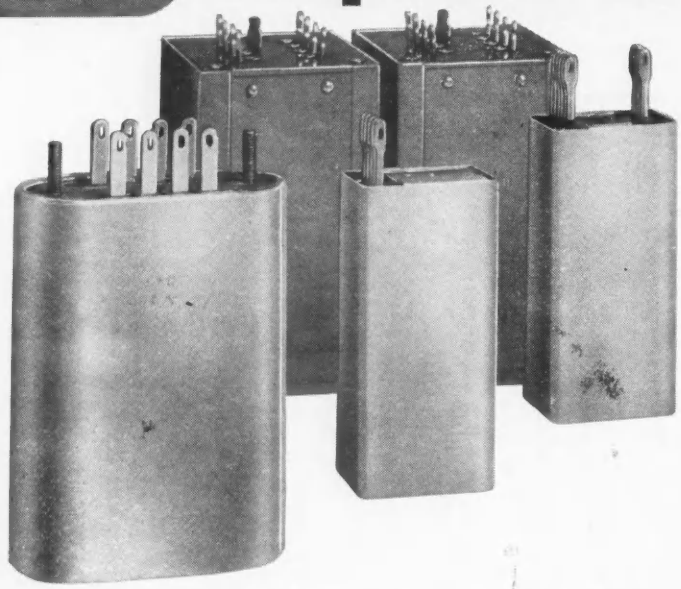
ADC Telephone Coils



Many are in stock. All are electrically and physically interchangeable with Western Electric. You'll like ADC's price and delivery.

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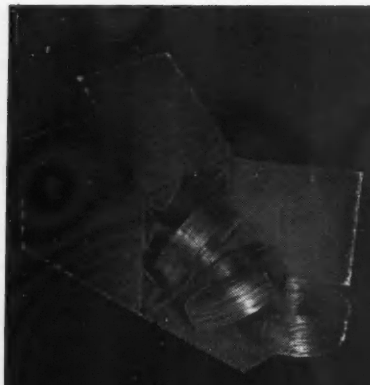
TRANSFORMERS • REACTORS • FILTERS • JACKS AND PLUGS • JACK PANELS



Wire for all type spinners

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LASHING WIRE

WE PRODUCE

The finest lashing wire possible because we believe . . . that lashing wire is one of the important parts of the cable plant, its duty being to hold the cable to the messenger for the life of the plant.

•

WE COIL

The best coil possible because we know . . . that tangled or out of shape coils can cause spinning trouble, waste and delay.

Write for Complete Information

CABLE SPINNING EQUIPMENT CO.

Topeka Kansas

Smith Joins Superior As Chief Engineer

WARNER T. SMITH, with over 20 years' experience in various aspects of the telephone, electrification, and electronics industries, has been

WARNER T. SMITH

named chief engineer of Superior Cable Corp., Hickory, N. C.

Prior to joining Superior, Smith was associated with Anaconda Wire & Cable Co., first as assistant manager, then manager of sales to government agencies. He has served the Rural Electrification Administration both as an engineer and as assistant chief for staff engineering, telephone engineering division. He also was associated with the Edison Electric Institute, and worked as an industrial analyst with the Communications Division, National Product Authority of the Dept. of Commerce.

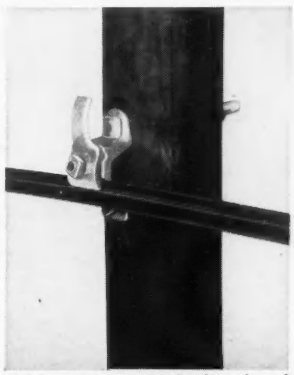
National Electric Div'n. Advances A. J. Conley

ARTHUR J. CONLEY has been appointed manager of conduit and building wire sales, National Electric Division, H. K. Porter Co., Inc. Conley formerly was assistant to the divisional sales manager. In his new position he will be responsible for the sale and promotion of all conduit products and building wire.

Conley joined National Electric in 1953. For two years prior to his assignment to the Pittsburgh office he was service manager in the Cincinnati regional office.

SUPERIOR I.M. CABLE

Needs No Separate Messenger!



Cable messenger is firmly gripped between jaws of Tangent Support

Supported Exchange Type Cable Installs up to 4 times FASTER...

When you install SUPERIOR I.M. Cable, the need for spinning or supporting the cable to a separate messenger is completely eliminated!

Choose the core construction you need with color-coded plastic insulated conductors and longitudinally applied corrugated aluminum or copper shielding over the core tape . . . sizes 6, 12, 18, 25, 50, 75 and 100 pairs in 24, 22 and 19 gauge soft-drawn copper. Cable exceeds current industry specifications.

The messenger, size 7/32", 19 galvanized strands, is an integral part of the cable jacket. Breaking strength is 6300 pounds. Can be gripped, pulled and tensioned using standard techniques.

Install SUPERIOR I.M. Cable, supported exchange type and save time and money!

Write for complete information and prices to

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TELEPHONE MARKET PLACE

Largest Circulation Serving The Telephone Industry

HELP WANTED

CABLE SPLICERS, Station Installers. Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1800 Johnson Street, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

AMBITIOUS MEN — Qualified as station installers, equipment installers, cable splicers, linemen. Work in midwest, Harris-McBurney Co., Inc., P. O. Box 267, Jackson, Michigan.

SALES ENGINEER—Man with sales experience in the Independent Telephone Industry required. Must be familiar with telephone power equipment, (battery chargers, ringing generators). Be willing to travel extensively and relocate in the Northeast. Send Complete resume including salary requirements to: The Warren Manufacturing Co. Inc., Littleton, Mass.

A TELEPHONE COMPANY IN THE CARIBBEAN AREA DESIRES TO FILL THE FOLLOWING POSITIONS. EXPERIENCE AND FAMILIARITY WITH REA ENGINEERING, CONSTRUCTION AND MAINTENANCE PRACTICES IS DESIRABLE. IN REPLYING SEND COMPLETE RESUME INCLUDING PRESENT SALARY.

EXPERIENCED OUTSIDE PLANT ENGINEER Capable of field engineering outside plant layout and project preparation, including cost studies, analysis and assistance in the preparation of annual budgets.

* * *

EXPERIENCED GENERAL PLANT SUPERVISOR Capable of supervising installation, construction and maintenance of inside and outside plant.

* * *

EXPERIENCED CONSTRUCTION AND MAINTENANCE SUPERVISOR Capable of exercising supervision over construction and maintenance crews for underground conduit, underground and aerial cable and open wire plant.

BOX NO. 126 c/o
TE&M, 7720 Sheridan Rd., Chicago, Ill.

TECHNICAL POSITION, Wire Chief or equivalent. Ten years experience including thorough training in step dial equipment, carrier, toll tieketing and related direct distance dialing apparatus, engineering experience. Write Box 127, c/o TE&M, 7720 N. Sheridan Rd., Chicago, Ill.

POSITION WANTED

DESIRE to relocate. Have degree in Business Administration. Experienced in management, construction, maintenance and Dial C. O. Installation. Write Box 120, c/o Telephone Engineer and Management, 7720 N. Sheridan Rd., Chicago, Ill.

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When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It is our only means of identifying the advertisement you answer.

TELEPHONE ENGINEERS And SUPERVISORS

$8-20,000 PER YEAR

. . . plus expenses and relocation allowance.

Age no barrier.

Must have experience in one of the following categories:

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MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service $15.00 each. Turtle Lake Tel. Co., Turtle Lake, Wisc.

SUBMARINE CABLE SHIP available in U.S.A. or abroad. 155 feet length over-all, 36 foot beam, 950 tons full load displacement. Ideal for close waters and modest cable laying operations. Anthony Zahardis, North Country Rd., Mount Sinai, N. Y.

KELLOGG UNIVERSAL Switchboard — 2 position 34 cord circuits. Cook Type L Distributing Frame — 750 line terminals 460 No. 100 Protectors. Kellogg Wire Chief Test Cabinet. Raytheon Rectichargger Cat. No. 1067B. Mount Horeb Telephone Co., Mount Horeb, Wisc.

ONE MODEL K-5 Decimonic Sub-Cycle. Like new. Write or call for more information. Luck Telephone Co. Luck, Wisconsin. Greenwood 2-2925.

BURROUGHS MODEL F1000 Alphanumeric Accounting Machine. Control units are presently programmed for telephone utility billing using a multi-copy statement and subscriber ledger, and employe payroll accounting including quarterly payroll reports. This machine, purchased new in 1959, will be available March 1961. Sales price will allow for normal depreciation, conversion costs and discount in lieu of sales warranty. Samples of all forms available upon request. Please address all inquiries to Auditor, Western States Telephone Company, Box 305, Holbrook, Arizona.

FOR SALE

NEW—COOK XB. POLE TERMINALS, 16 PAIR — UNPROTECTED, WITH 5 FT. STUBS. $6.00 EA.

NEW—SPAN CLAMPS, MESSENGER WIRE TYPE. .10c EA.

REBUILT—W. E. DIALS. 5-H — or 6A — $2.50 EA.

USED—GOOD—33 CALCULAGRAPHS. $35.00 EA.

REBUILT — OR SOLD AS REMOVED FROM SERVICE, STROMBERG SUBSCRIBER SETS, 1250 WALL — DESK — 1243 — 1443 — 1543-A, WITH DIALS, ST LINE — or 20-30-40-50 CY.

INDEPENDENT TELEPHONE REPAIR CO.
2137 West 21st St. Chicago 8, Ill.
LAfayette 3-5439

DECIMONIC ringers, 20-30-40-50-60-cycle for 302 Western telephones, also for A. E. 40's and Stromberg 1243's. Please state price & condition. Could also use some 354 Western wall-type telephones. Western Telephone Co., Springfield, Minn.

WANTED TO BUY

TELEPHONE COMPANY, 300 to 2000 stations, Wisconsin or Minnesota. Reply to Box 125, c/o Telephone Engineer.

WANTED — All makes, old telephones. Our truck will pick up and pay you cash on the spot. Telephone Co., Turtle Lake, Wisconsin.

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BELTS — CLIMBERS — Complete Linemen's equipment, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.

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BOOTHS — Telephone — Outdoor — Indoor — Steel — Stainless Steel — Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 37, N. Y.

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BORING MACHINES, EARTH — Highway Trailer Co., Edgerton, Wisc.

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EARTH BORING MACHINES
WYOMING VALLEY EQUIP. DIV.
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CORDS, Switchboard (with or without plugs), Instrument (straight and retractile) cords in eleven colors. — Commercial Cord Co., Inc., 26 Main St., Clifton Springs, New York.

CORDS, Switchboard & Telephone — Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.

DIRECTORY SERVICES

ADVERTISING, DIRECTORIES—General Telephone Directory Co., 1800 Oakton Street, Des Plaines, Ill.

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DECALS
Made for trucks and equipment
Small or large quantities
Write for free catalog.
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Flexiduct Universal Fitting

Solves All Over-the-floor Fitting Problems
Part No. 345
Serves as a Tee, Ell, Riser, 4-Way or Junction Box.

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SWITCHES

Repeater H-61678 Trunk (Pulse) Auto. to Auto. (New)
Repeater H-61909-1A Outgoing Pulse Repeater for Loop Trunks of 3000 ohms or less (Used-Excellent)
Selector H-58655 (New)
Selector H-51223A or D-205179-A (Used-excellent)

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D-283154-A Ring-Thru Repeating Coils w/covers (Unused)
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HUDSON 8-0655

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POLES, Southern Yellow Pine — Texas Creosoting Co., Orange, Texas.

POLES

POLES, Southern Yellow Pine — Taylor Colquitt Company, 217 E. Main St., Spartanburg, S. C.

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SUBMARINE CABLE Lead (All New) 21 Pair #19 Ga. Paper Ins. Lead Covered, ...one length.
Double Steel Wire Armor, two Layers Jute .....2100 Ft.
26 Pair, #19 Ga., As Above,....14000 Ft. (800-& 500 Ft. Lengths)
51 Pair, #19 Ga. As Above, one length. .....2,000 Ft.
OTHER CABLE 11 Pair, #19 Ga. Paper, Lead (4500 Ft. Reels) .....22,000 Ft.
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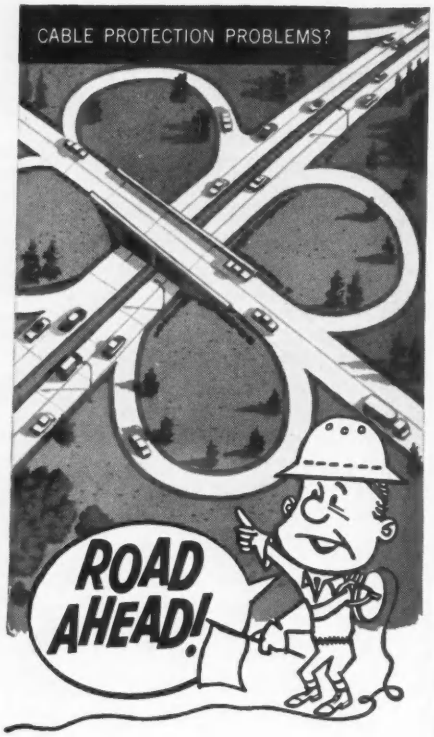

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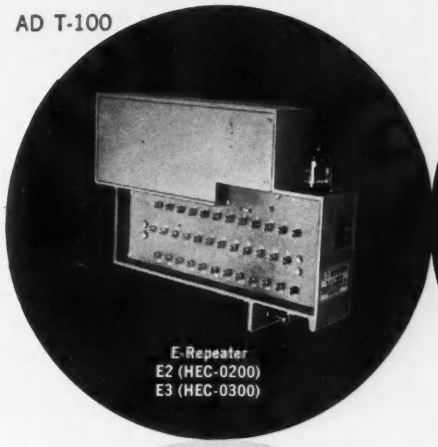

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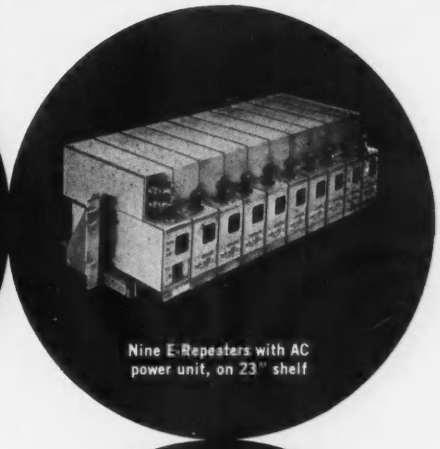

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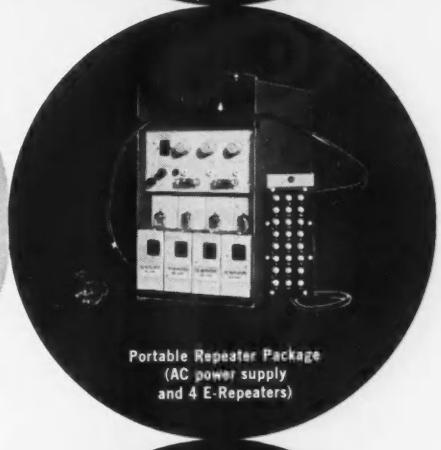

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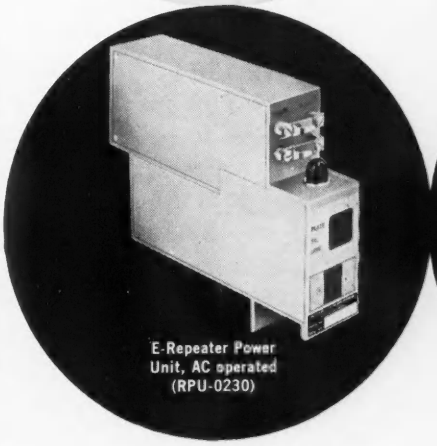

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Cable Chewers Wanted

LYING FATHOMS deep on the ocean floors the Bell System's six submarine cables — or, more precisely, their protective "wrapping" — are subject to attack by marine organisms in search of food or shelter. Finding what materials best resist this biological attack is a research program undertaken by the Bell Lab's Environmental Protection Group.

Laboratory research at Murray Hill, N. J., consists of accelerated tests to determine the effect of bacteria on certain materials; analysis of oxygen content in specially prepared batches of sea water indicate the extent of bacterial attack on organic materials by measuring the organisms' breathing. The effect of anaerobe bacteria (which require no oxygen) can be determined by the presence of hydrogen sulfide, a product of bacterial activity which breaks down organic materials.

Marine-exposure tests are carried on at Wrightsville Beach N. C. and Daytona Beach, Fla. Studies there are concentrated on borers, organisms that attack materials as a source of food or shelter. More than 500 samples of plastic, rubber-like or natural organic materials have been lowered into the sea to study the effect of these organisms on the cable wrapping, Part of each sample is in the bottom sediment and part in the water. So far, results generally indicate that an attack by various organisms on polyethylene materials — the plastic used in squeeze-type bottles — will be unsuccessful; certain formulations of polyvinyl chloride plastics (used in garden hoses and auto seat covers) also seem able to resist the organisms.

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SOMEBODY threw the wrong switch at the New York Coliseum and ruined one of the telephone's biggest moments.

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A scientist who was in on the gag picked up a white phone in New York, called Britain's Jodrell Bank radio-telescope site and asked for "Command 46" (an unlisted number). In less than a minute an electronic warble came back from the rocket.

Meanwhile, back at the Coliseum, all was dark. The winking red numbers that had been clicking off the rocket's distance from earth on a big screen blinked out and the instruments changing its voice into a brilliant green curve went dead. Somebody — obviously not an engineer — pulled off the power at the critical moment.

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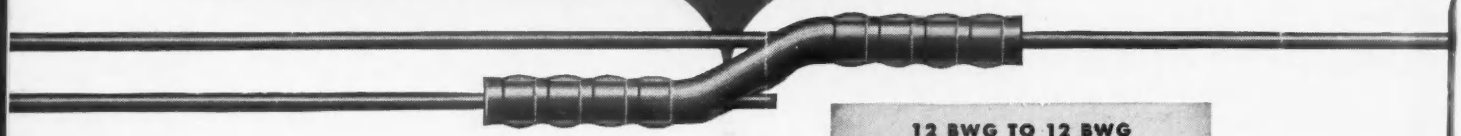

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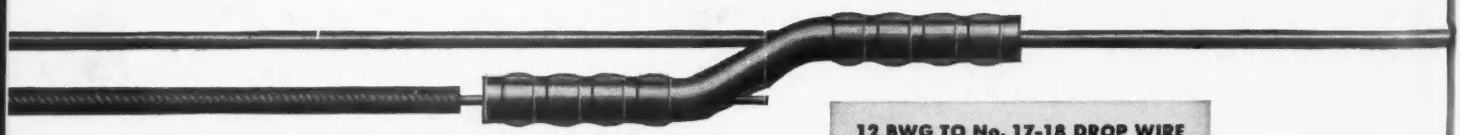

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